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The Forest Fires of 1910

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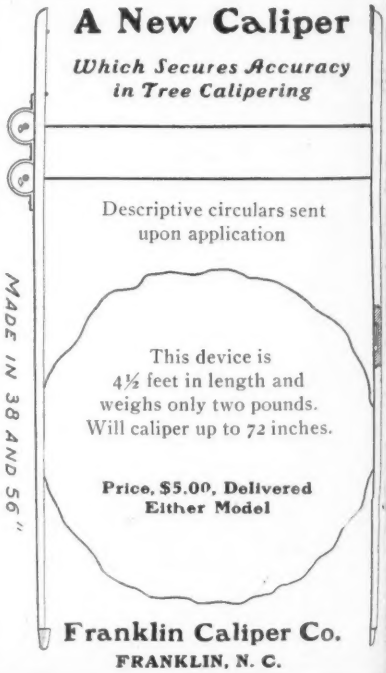

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The Magazine of the American Forestry Association

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is a national organization composed of public-spirited citizens who are interested in the prevention of the wholesale destruction of our forests, in forest extension and utilization, and in the fullest cooperation of national, state, municipal, and private agencies for these purposes. The Association has no business or governmental ties or alliances. Its work is to educate the people to know and understand the value and necessity of forests in the Nation's life and the way to maintain them to the best advantage through scientific forestry; and to bring about such wise legislation as will best secure the desired results. It is the people's forestry advocate and the representative of forestry before the people.

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American Forestry

Vol. XVI NOVEMBER, 1910 No. 11

FUNDAMENTALS OF THE FIRE PROBLEM

By HENRY S. GRAVES

Forester, U. S. Department of Agriculture

At the request of AMERICAN FORESTRY, Mr. Graves was kind enough to set forth in the following brief statement the main difficulties in the way of protecting forests from fire, the general status of protective measures throughout the country, and the things which must be done if the waste of forest resources through fire is to be promptly and effectively checked.—Ed.)

NO SINGLE forest problem is so important as fire protection, for the risk from fire to-day stands as a great obstacle in the way of the practice of forestry. In the National Forests, the first work has necessarily been to organize the Forests for administration and protection, and this work has considerably retarded the development of the work of silviculture. As for private holdings, the main reason why forestry is not more widely practiced is the danger that the required investment may be lost or seriously impaired by subsequent fires.

The agitation for forestry and forest protection has now been carried on for many years, and the principles of forestry have been endorsed by the public. But the problem of getting the known and approved protective principles carried into actual practice is as yet far from solution. This has been clearly demonstrated during the past season, in which the loss from fires will prove to have been greater, perhaps, than ever recorded before.

The bulk of the public forest land in the United States is now included in the National Forests, which are already well organized and are managed by an administrative and protective force. The protective force is, however, inadequate for a complete and effective control of fire. What is first required is a rapid extension of the system of trails, fire lines, and telephone lines. Considerable public expenditures are of course needed for this improvement work, as well as for increased patrol. When the value of the property and the benefit to the forests and to the public are considered, such expenditures, however, would amount to a cheap insurance.

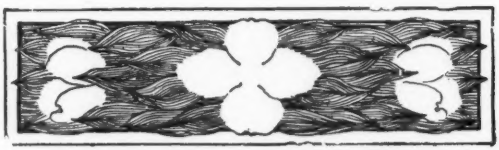
With private forests, which comprise about 80 per cent of the forests of the country, protection presents a much more difficult problem. Individual owners of large tracts are often able and willing to establish systems of fire protection, and where most of the land is held in such large holdings it is often feasible to secure organized protection by cooperation. Cooperative protection of this kind is being successfully carried on in Montana, northern Idaho, Washington and Oregon, and in certain parts of northern New England.

But when there is a great area of wild land, a large part of which is in the form of small private holdings whose owners are men of small means or are non-residents, the difficulty of securing organized cooperative protection is very great. Until now, efforts in this direction on private land in wild forest regions have been confined to the larger owners.

In the systematic protection of private forests by the states but little progress has been made. To be sure, some states have a system of fire wardens whose duty it is to collect a force of men and attack such fires as may be started within their respective districts; and a great deal of loss from fire has been prevented by such systems. But it is a fundamental principle in all forest fire protection that there must be an organization to prevent the starting of fires, and not merely one designed to put fires out after they get a start. Private forests cannot be fully protected until the individual states assume their responsibilities and establish at public expense effective systems of forest patrol. The states need not and should not assume the entire burden of protecting private lands, but they should maintain a state patrol system, with one or more men for each township whose duty it should be to patrol forest lands during the dry season. Such patrolmen should have all necessary authority in matters pertaining to protection. Private owners will supplement this system with such a force of men as will make the forests safe.

In New York the state preserves are patrolled, but the system does not extend to the entire state, and private lands within the preserves are the only private lands directly benefited. In Maine and in New Hampshire, lumbermen, either independently or with the state, have done much to establish systems of watch-towers.

The main burden of protecting forests from fire must be borne by the public. The purpose of forestry is to secure certain benefits to the community and to the country as a whole. It is therefore entirely proper that the principal cost of protecting our forests should fall upon those who are benefited.



HOW THE FIRES WERE FOUGHT

By F. A. SILCOX
Assistant District Forester, District 1, U. S. Forest Service

(Forests in District 1 were the scene of the terrific fires which, in the absence of sufficient trails and equipment for communication and fire fighting, were swept beyond control by the cyclonic winds of August 20 and 21 and, besides devastating some of the finest virgin timber in the country, cost the lives of seventy-four of the temporary force, injured many other persons, destroyed many millions of dollars worth of property, and lost to industry hundreds of thousands of dollars more in wages. Every circumstance which attended the origin and behavior of these fires proved beyond all doubt the ability of the Forest Service completely to protect the National Forests as soon as the Forests are fully equipped and manned for protection—and not before.—Ed.)

CHARACTER OF THE COUNTRY

District One of the Forest Service, with headquarters at Missoula, Montana, includes all of the National Forests in the panhandle of Idaho and in Montana, North Dakota, Minnesota, and Michigan. It includes 28 National Forests with an aggregate area of 29,918,043 acres. The main continental range, from whose crest the rain and snow waters make their way westward to the Pacific and eastward to the Gulf, divides the district into two natural divisions. A striking contrast exists in the type and character of the country on the east and west of the divide; and this contrast has such a vital bearing upon the fire situation that in order to understand the great fires of the past summer and the difficulties encountered in controlling them, a clear picture of the respective types of country is essential.

East of the divide the timbered areas are broken by open parks, the solid bodies of timber being confined mainly to the north slopes. The predominating species, lodgepole pine, although forming extremely dense thickets in early life, opens up somewhat as the stands grow older and carry little underbrush. The red fir and yellow pine types are open stands in which little undergrowth is found and through which travel is fairly easy. In this type of country it is possible to travel at a fairly rapid rate, either on foot or with horses, by working through the timber and open parks and along the bald ridges.

SLOWNESS OF TRAVEL

In striking contrast is the country west of the divide, which includes in this district Northwestern Montana and Northern Idaho. Heavy dense timber with heavy undergrowth and with very few, widely scattered mountain meadows, is the characteristic type of country. The predominating species are Western white pine, cedar, larch, fir, and hemlock, all of which grow in dense stands and through which, both on account of the underbrush and windfallen timber, travel with a horse is, without trails, a physical impossibility, and by foot, with a pack on one's back, a most arduous and tedious task.

Where open areas occur and travel is possible, even without trails, as in the forests of Eastern Montana, fires can be controlled if sufficient patrol is maintained during the dry season, largely because the fires can be reached shortly after being discovered. The best proof of this is the fact that no fires of any size got beyond control even during the very dry and windy season just closed, east of the divide. Many fires occurred,

FIRE HAVOC IN THE BITTERROOT MOUNTAINS

but were reached and quickly put out or trenched and brought under control before attaining serious proportions or doing any large amount of damage. The point is that these fires were discovered and reached very shortly after they started, and were, therefore, controlled with comparative ease.

DIFFICULTY OF FIRE CONTROL

Fire control in such a territory, however, as the dense forests of western Montana and northern Idaho, is a most serious and difficult problem. All the big fires of this year occurred in this type of country, for very obvious reasons—the density and unbroken character of the timbered areas and the extreme difficulty and in many instances impossibility of getting to the fires when they were small.

There is only one way to meet this problem with any degree of success, and that is by increased patrol in the heavily timbered areas, with means of rapid transportation and communication in the form of trails and telephone lines. Fires must be discovered when they are small. Discovery, however, is but one factor, and although a most important one, it availeth little if after a fire is discovered it is impossible on account of inadequate transportation facilities to get to it. This is exactly what occurred during the past season. Many fires were discovered by patrolmen, but before even they themselves could get to them assumed proportions which made a large crew and an organized fire camp necessary

In many cases twenty or thirty miles of trail had to be cut before supplies and men could be put in to check the fire. Five miles per day is a high average for trail work, which in country of this character is the very roughest kind. The only available means of transportation is by means of pack horses, and in order to use even this method trails are absolutely essential.

Only one other known method can be used, to pack the supplies and equipment on man-back, but here, too, trails must be had. It is possible, of course, for a man to meander his way through the brush and windfalls with a 30 or 35 pound pack on his back, but when a number of the large mountain fires are 15 to 100 miles distant from railroads, and in many cases without trails, a man cannot be expected to make his way by hard work through the tangle of brush and dense forest at the rate of 10 or 15 miles a day and then be ready to fight fire when he reaches the scene of action. He is too badly in need of a rest before tackling the hard trenching work on a fire. Fresh men must be had in order to be effective. With a comprehensive, well-coordinated system of trails and telephone lines this can be accomplished.

THE PROTECTIVE FORCE

Each National Forest under the jurisdiction of a Forest Supervisor, with his Deputy and Forest Rangers and Forest Guards, is a unit of 1,000,000 or more acres, in some cases more than 2,000,000 acres. This means a tract of land about 75 miles long by 40 to 50 miles in width, or from 1,800 to 3,500 square miles. The country is rough and mountainous and hard to travel over.

An adequate patrol force for the heavily timbered forests should contain at least one man to every 30,000 acres. On the more lightly timbered forests east of the divide one man to every 50,000 or 60,000 acres has proved sufficient. To patrol this area good look-out points on the prominent peaks are selected, from which it is possible to see a large scope of country. Trails along open ridges are used wherever possible in connection with these look-out points.

Another important part of the protective work is the patrol of trails frequented by campers and hunters. Constant patrol during the dry season along the rights-of-way of railroads traversing the forests is one of the most important features of this work.

EQUIPMENT REQUIRED

With a well-distributed patrol force and a coordinated system of trails and telephone lines, the question of location and control is largely covered with one

Back-firing in the Bitterroot Mountains

exception—equipment. As a fire department in a city maintains engines, men, and horses, as a form of insurance against loss of city property, in no less degree is it necessary to be adequately equipped to meet a fire in the forests. There must be men, tools, and pack-trains immediately available if the fire is to be controlled, and it must be reached when it is fairly small.

During the past fire season there were at one time in the field in Northern Idaho and Northwestern Montana, on the National Forests, approximately 300 hired pack horses. This, of course, was during the very worst conditions, when the woods were as dry as a tinder box and fires badly scattered. The securing of these pack-trains was one of the chief sources of delay in getting men and supplies to the fires. By equipping each Forest with horses where transportation facilities make it imperative, this delay can be largely obviated. In addition to the horses, caches of tools, consisting of shovels, mattocks, axes, and saws, are distributed throughout the Forest. These emergency caches are for equipping at least 10 men.

UNCOMMONLY DRY SEASON

Usually the fire season begins about the latter part of July and lasts through August and early September. This year no spring rains occurred and the country began to get dry by early June. Steps were taken to prepare for a bad year. Extra patrol was put on. Co-operation was planned and effected with railroads and lumber companies, and people were warned to be very careful about burning brush to clear land. In spite of all precautions, fires originated from the burning of brush, from locomotives and logging engines, from campers, and from lightning.

The practically unbroken drouth during June, July, and August was accompanied in many localities by dry elec-

Pack Train in the Bitterroot Mountains

trical storms and almost incessant high winds. By the fifteenth of July serious fires were burning on nearly every Forest west of the continental divide, and many more starting every day.

EMERGENCY FORCE AND EQUIPMENT

By the middle of July over three thousand extra laborers were employed on the fire lines in Northwestern Montana and Northern Idaho. This force had been secured, equipped, and organized for work in the space of from two to three weeks. The labor markets of Missoula, Spokane, and Butte had been called upon, and furnished the bulk of the men. Tools, thousands of mattocks, shovels, and axes, were drained from the mercantile stores wherever available, until their supplies were exhausted and special orders had to be rushed through in order to complete the equipment of the men.

The country had been scoured for pack animals, and trains of from 5 to 40 horses each secured to transport the supplies and equipment of the fire fighters into the hills. The heavily timbered country afforded practically no feed for the horses, and the packing of horse feed, besides the supplies and equipment, had to be provided. Experienced packers had to be obtained to handle these trains in the hills. Any one familiar with western mountains will appreciate the importance of this one item alone.

The inaccessibility of the territory lying immediately contiguous to the Idaho-Montana divide in the Clearwater and Cœur d'Alene Forests made it necessary to equip the pack trains in Montana and have them drop over the divide on to the Clearwater and St. Joe River drainages. Trails from the Montana side were accessible, but when the top of the divide was reached, in most cases trails had to be cut to get the pack horses through. With this done and

the camps established in the field near the bigger fires, reconnaissance to locate any other fires had to be made. Fires were located, but owing to the impossibility of getting a pack train and supplies into them without trails, they had in some cases to be left burning.

FATAL DELAYS

With adequate patrol, trails, and telephone communication, these fires ought to have been discovered and somebody been on the ground within 5 to 8 hours after the first smoke was seen; instead, it actually took from one to five days. If help was needed after the fire was reached, the Forest Guard or Ranger would have, without trails or telephone lines, a trip of from 30 to 60 miles on foot to get it. This would consume from 1 to 3 days. If necessary to return with a bunch of men, imagine crawling through the brush with packs on your backs to get to a fire, or else cutting out miles of windfall and brush.

Think of the time consumed! Fire has the peculiar faculty of showing no disposition to wait. Perhaps on account of this delay a fire which in the first place covered only a few acres has in the absence of any restraining influence covered one or two thousand acres, or perhaps fifty thousand acres. Don't think this improbable; visit some of the great areas of charred stumps and snags, where once stood timber worth on the stump from $2.00 to $4.50 per thousand board feet. These were some of the difficulties encountered in the dry season of 1910

THREE THOUSAND FIRES PUT OUT

By the middle of August, over three thousand small fires had been put out by the patrolmen and over ninety large fires brought under control by organized crews of from twenty-five to one hundred and fifty men. Fires once brought under control were repeatedly fanned into new life by high winds, and racing up into the crowns of the trees, jumped across the trenches which restrained them.

The weary fighters had to drop back and throw up a second or third or even fourth line of defense. New fires were starting every day, and the dense smoke made it extremely difficult to locate them, except when close to roads or railroad rights of way. With the force of men in the field, however, assisted efficiently by ten companies of Federal troops, and the organized pack-train system of transportation, most of the fires were well in hand on Saturday, August 20.

WHEN THE HURRICANE CAME

On the afternoon of that day a hurricane, strong enough in many localities to uproot whole hillsides of timber and force men out of their saddles, swept over the Forests adjoining the Montana-Idaho state line. The gale continued for fully twenty-four hours and fanned every smouldering fire in its path into uncontrollable fury. They flamed up into the crowns of the trees and spread through the adjoining timber, much of which was uprooted before the fires reached it, with incredible rapidity.

The roar of these fires was heard for miles and was likened by some of the Rangers in their path to the noise of a thousand freight trains crossing simultaneously as many steel trestles. At many points these fires jumped rivers a quarter or half a mile wide, and in several instances leaped across canyons a mile or more in width, from ridge to ridge, leaving solid strips of green timber untouched.

Cinders, ashes, and burning embers were carried many miles. The nearest fire to Missoula, Montana, was about 12 miles, yet cinders as large as robins' eggs fell in the streets, and the clouds of smoke and ashes were so thick that the electric lights were lit at 3 o'clock in the afternoon. The sun shining through these clouds gave a vivid, lurid glare as of a great conflagration. For many days it shone only as a great round blood-red disk.

WHERE THE MEN WERE KILLED

It was the top fires of August 20 and 21, driven by cyclonic winds, which wrought the destruction of life and property in Idaho and Montana this summer. Within forty-eight hours a strip of country along the Bitterroot Mountains, at least one hundred and twenty miles in length, extending from the Clark's Fork River to the head of the Selway Fork of the Clearwater, and from twenty to thirty-five miles in width, was more or less completely burned over. Seventy-four employees of the Forest Service, all temporary laborers, were killed, and as many more injured.

The rescue of the injured and missing men and of the settlers and prospectors and others endangered in the mountains necessarily took precedence over fire fighting for several days, but by August twenty-fourth the combat with the fires was resumed at nearly all points and continued until the early September rains largely eliminated further danger.

Of all the causes of forest fires, lightning alone is not controllable. It is, however, possible by an adequate system of patrol, communication, and transportation, to discover and get to all fires soon enough to put them out. Since lightning is one of the most prolific causes of the more remote fires, the importance of catching them when they are small cannot be too strongly emphasized. But the inadequate trail systems on the Forests, owing to the size of the country and the insufficiency of funds to build any but those of the most urgent character, made it impossible to get to a great many of these fires until under the stimulus of the winds and dry weather they had become too large to be handled by a few men.

It is exactly analogous to the position a city fire department would be in if the streets were kept continually blocked and each time a call was made work would have to be done to clear the streets before the engines could reach the fire. Is it necessary to emphasize the importance of sending in the alarm quickly and getting after the fire before it gains headway? If the Forests are to be protected from fire, trails must be put through them.

THE SECRET OF FULL CONTROL

Summarizing the essential things to do to make the location and control of fires in the National Forests possible:

(1) A comprehensive system of ridge and stream trails which extend over the entire Forest. These trails average in cost from $60.00 to $100.00 per mile, with an 18-inch tread and 8-foot clearing. Each Forest should eventually have from 200 to 400 miles of trail.

(2) A system of well-selected look-out points and ridge trails, so coordinated as to give primary control of all districts for locating fires.

(3) A coordinated system of telephone lines extending up the main streams and tapping by tributary lines the look-out points.

(4) The purchase and maintenance of pack horses fully equipped with pack saddles. These horses can be used for building trails and, when the emergency arises, put on duty packing fire supplies.

(5) The location of caches of tools throughout the Forest at strategic points. These tools should consist of mattocks or grub-hoes, saws, axes, and shovels, enough to equip 10 men from each cache.

(6) A patrol on heavily timbered areas of at least 1 man to 30,000 acres, and in the more open regions of 1 man to 50,000 or 60,000 acres.

TRENCHING AND BACK-FIRING

So much for general control. Now as to the methods of fighting the fires when reached.

Fires are of two classes—ground fires and top fires. The ground fires are always the first to start, and the top fires occur only under high winds. Fire runs up hill rapidly under high winds. Trenches from 2 to 4 feet wide are dug down to mineral soil and all the inflammable brush and débris possible thrown away from the fire in order to give the men an opportunity to make a stand. If

the fire is creeping very slowly it can usually be stopped upon reaching this line. If fanned by a breeze, it is necessary, if the wind is in the right direction, to start fire all along the trench and back-fire.

The trenches are located along the ridges or follow the contour of the hills. Advantage is taken of streams and other natural fire breaks, such as rock-slides, to help out in making the trenches. In many cases back-firing is done at night, even against the wind, by clearing out the timber to a width of 20 feet along the trench. The clearing of the timber is to prevent a flare-up and jump across the line.

FIRE-FIGHTING CREWS

Individual fire-fighting crews include from 12 to 20 men. These men are equipped with mattocks, axes, and shovels. The proportion of each kind of tool varies in accordance with the character of country. In open yellow pine, shovels are mainly used. In dense cedar, hemlock, and white pine, mattocks and axes are most useful. Each crew is equipped with 2-man cross-cut saws to cut out large fallen timber. With a 20-man crew in dense timber the distribution is about 10 mattocks, 5 shovels, and 5 axes. Enough shovels, however, must be provided to supply each man, since the shovel is the most effective tool after the trenching has been done, and patrol on the trench to hold the fire from crossing is the important work.

Depending on the country, a crew of 20 men can cut from ¾ to 1½ miles of trench in a day. It is clear from this why so many men are required on the fire line. A large number for a short period is essential in order that the fire line can be put in as quickly as possible.

In placing the fire trench many experienced fire fighters differ; some fight up close to the line, not giving any more than they can help; others get ahead of the fire line and trench and back-fire to stop it. The method of fighting close is most applicable when the fire is creeping slowly down a hill. On account of the fires' quieting down at night, the close fighting can usually best be done at that time. In all of the methods the object is to get the ground fire surrounded on all sides by a trench dug to mineral soil and all inflammable débris removed so that it cannot cross the line.

Fighting ground fires is hard, mean work. Digging through the forest litter and usually rocky soil in the heat of an August day, with the smoke and ashes smarting the eyes and irritating the throat, is no child's play. There is no danger until high winds change the ground fires to top fires. The violence of a top or crown fire depends upon the one factor upon which the failure or success in holding a fire depends—the wind. There is no known way to fight a fire of this character when the wind is very high, except to back-fire from a considerable distance, where advantage can be taken of natural barriers, such as roads or bare ridge tops.

FULL CONTROL POSSIBLE

The question will be raised as to whether it is possible to protect these areas from fires and whether or not it is worth while. Appreciating even the full significance of the catastrophe of this year, there is not the slightest doubt but that with an adequate trail, look-out, and telephone system, and a sufficient equipment of tools, the fires can be controlled. The fundamental factors in the whole situation are telephone communication, trail transportation, and man patrol.

Now, granting the practicability of locating and controlling fires, the question, "Is it worth while?" has been raised many times. The estimate of valuable timber in the present district of periodical fires in the National Forests of Northern Idaho and Northwestern Montana is approximately 80 billion feet. Conservatively valued at $2.50 per thousand feet, this represents a total money value of some $200,000,000. The recent fires covered two watersheds where sales had actually been made aggregating in stumpage value $850,000.

This timber has all been killed by fire, resulting in an actual reduction in stumpage value of at least a half, which represents a loss of $425,000 to the nation. Probably not over 50 per cent of this timber can be sold in its present condition, which increases this loss to over $600,000. These sales aggregated 200,000,000 feet, and for every one thousand feet lost, there is lost $10.00 in wages to the community. Realize, please, that this represents but two small watersheds not aggregating over 15,000 acres. These two areas are selected because they represent not estimates but actual purchase prices obtained under competitive bids.

The immediate work which now faces the Service in this district is the disposition of the dead timber while still merchantable. The mapping, estimating, and appraisal of the burned areas is being aggressively pushed in order to prepare for sales as soon as possible.

THE FIRE FIGHTERS

By Arthur Chapman

"Where's Smith and Hennessy, Edwards, Stowe—
  Where's Casey and Link and Small?"
The ranger listened, and murmured low:
  "They're missing, Chief, that's all.

"Where the smoke rolls high, I saw them ride—
  They waved good-bye to me;
Good God! they might as well have tried
  To put back the rolling sea.

"I rode for aid till my horse fell dead,
  Then waded the mountain stream;
The pools I swam were red, blood red,
  And covered with choking steam.

"There was never a comrade to shout 'Hello,'
  Though I flung back many a call;
The brave boys knew what it meant to go—
  They're missing, Chief—that's all."

—Denver Republican

ANOTHER EXAMPLE OF BURNED AND WINDTHROWN TIMBER

WHAT PROTECTIVE CO-OPERATION DID

By E. T. ALLEN
Forester of the Northwestern Forestry and Conservation Association

(The success with which the affiliated private fire protective associations of the Pacific Northwest met the difficult situation thrust upon them by the menacing fires throughout the region makes a remarkable showing. Scarcely less noteworthy is the fact that this success was due, first, to the example of the Forest Service, whose methods are closely followed by the associations, and second, to a liberal policy of spending money in order to get results. The private co-operators spend from one to ten times as much on fire protection alone as the Government spends for the entire administration of the national forests.—Ed.)

PRINCIPLES OF PROTECTION

The Pacific Northwest suffers from fire exactly in the measure that as a whole or locally it ignores the two basic essentials of prevention—respect for fire laws and preparedness for emergency.

Excepting the comparatively few caused by lightning, every forest fire results from malice or avoidable carelessness. Either is criminal, prohibited by laws entitled to the respect and enforcement accorded laws against theft or murder. With means of securing such respect and enforcement, we should have little fire trouble.

Every fire, however caused, is small enough at first to be easily put out. With an adequate force of trained, vigilant men, furnished proper transportation, means of communication, and equipment, fires in the forest do not become forest fires. Patrol is essential, and is effectual in the measure of its organization and facilities.

These proven axioms are recognized by the Forest Service, which proceeds accordingly, as far as wholly inadequate funds permit, in protecting the national forests.

Outside the national forests these axioms are not recognized, or at least not applied, by state or public to a degree even approaching that necessary to protect lives, property, and public welfare generally. This lack of defensive preparation results in tremendous injury to the community every year, and in abnormal years, of which 1910 is only one example, invites irretrievable disaster.

PRIVATE ASSOCIATIONS

While the interest of private owners in forest protection is no more direct or great than that of the community, it is more promptly realized. In the Pacific Northwest, especially in Idaho, Washington, and Oregon, private owners of forest land have consequently gone even farther than the Government, and very much farther than the states or the public, in the installation of protective systems. Their methods are practically identical with those of the Forest Service, making patrol the main point, supplemented by fire fighting, trail and telephone building, etc. The expense is largely borne by co-operation, pro rated on the basis of acreage owned, although many owners do much independent work also.

There are about ten of these co-operative associations, among the largest being the Cœur d'Alene, Clearwater, Pend 'Oreille, and Potlach Timber Protective Associations in Idaho; the Washington Forest Fire Association, and the Oregon Forest Fire Association. They affiliate for many central purposes in the Western Forestry and Conservation Association, which is a grand lodge for all such organizations and for conservation associations in the five states from Montana to California.

In Idaho the state itself is a member of all associations, paying its full share per acre for state lands embraced. Washington does not share the expense of patrol, but helps defray the expense of additional day labor for actual fire fighting.

This work by the private owners gives the very highest efficiency in patrol and fire fighting. They are not limited by statute or appropriation bills in providing adequate funds and using them to meet emergencies. Being interested only in the best results, and technically familiar with conditions, they get good men and practical supervision. They spend from one to ten cents an acre for exclusive fire work during the fire season, while the Forest Service has to spread a cent or two over all sorts of administrative work for the whole year.

The private owner, however, is practically helpless in enforcing the punitive laws which are very generally regarded with contempt, because there is little state machinery for enforcing them, and here lies one of the greatest dangers to property and life outside the national forests.

WHAT THE CONDITIONS WERE

To come now to the specific conditions of the season of 1910:

When it became apparent that unusual drought was bringing a grave situation, the private patrols were gradually increased and every effort was made to reduce the hazard. The Western Forestry and Conservation Association had repeated warnings published in every newspaper in the Northwest. Letters were sent to loggers and others, urging every precaution in the woods. Circulars, posters, and other publicity matter were circulated widely. All this had undoubted great effect, but did not, of course, remove the general carelessness with fire that prevails where the fire laws are not respected.

Although June and July continued hot and dry after an unusually dry spring, and the danger during these two months had been equal to that of the ordinary entire season, the associations extinguished hundreds upon hundreds of fires in their incipiency and practically prevented any loss within their territory of millions of acres. But finally, in August, there prevailed throughout the Northwest strong winds which, with the forests already like tinder, fanned every fire that could not be reached at once into a serious conflagration.

An army of private patrolmen was by this time in the field, exerting every effort. The four Idaho associations had from 30 to 50 regular men each, the Washington association 125. Besides these, additional and independent patrols comprised several hundred more. Fire fighters were freely employed to check and hold fires that became serious.

But as conditions became worse, the systems broke at a few of their weakest places, and almost always for one of two reasons—persistent violation of the fire laws or juxtaposition of unprotected lands. It was an utter impossibility, especially after the force was taxed to the utmost where life and property was particularly in danger, to meet all the new fires that bust out as a result of public indifference.

THE RESULTS ACCOMPLISHED

Nevertheless, effort was never once remitted, and the associations, like the Forest Service, massed all the men they could hire wherever they were most needed, without regard for fine distinctions of ownership. Menacing fires were fought, although on the lands of men who had refused to protect them. The same credit is due very many owners who worked independently. In western Washington $200,000 was spent during the season for private fire work. The Cœur d'Alene association alone spent about $50,000 in Idaho, having as high as 850 men in the field, and its neighbors in proportion. The Washington association had 1,200 extra men. Oregon owners were less perfectly organized, so exact figures are not yet available, but doubtless spent $100,000.

Fire at St. Joe, Idaho, from a Distance of Four Miles

It is impossible to give any reliable estimate of the total loss at present, particularly in Idaho, for reports are constantly being changed by more careful investigation. First estimates seldom include possibilities of salvage where timber is not destroyed. Two important facts may, however, be stated with conviction: First, that the losses were few and insignificant when the area involved is considered; and, second, that had it not been for the timber owners' effort the contrary would have been true and the Pacific Northwest would have suffered a calamity past conceiving of. The really bad fires can be counted on the fingers, while those extinguished, which under the conditions that prevailed would otherwise have been as bad or worse, number by thousands.

It is sometimes believed that the lumberman is the enemy of forest preservation and should be compelled to greater duty to the public. Whether or not this is true elsewhere, in the Pacific Northwest he is doing more for the cause than any one else, and the problem, if the cause is to succeed, is to get the public to perform its own duty.

FOREST FIRES IN WASHINGTON AND OREGON

By C. S. CHAPMAN
District Forester, District 5, U. S. Forest Service

THE summer of 1910 was conspicuous by lack of rainfall. Early in the spring the snow left the mountains of eastern Oregon and Washington, where it usually lies until much later, and those who could read the signs predicted a dry summer. From the middle of June until the middle of September, a period of nearly ninety days, there was practically no rain. The result of this drought was that in early August the woods were as dry as they usually are in late September, with no immediate prospects of rain.

East of the mountains the grass was dry and parched, and a match or cigarette stub thrown into it easily started a serious fire. On the west side slashings became tinder-like and a spark from a donkey or locomotive was all that was needed to start a fire which in an hour would require twenty men to extinguish. The dense forest of the West Slope does not ordinarily burn easily. The dense shade protecting the underbrush from the direct rays of the sun causes it to stay green and so serve, in no small measure, to prevent the starting of fires in the ordinary way. But a fire starting in a dry slashing, with an enormous amount of fuel in tops, limbs, and defective and broken trees strewn over the ground to feed upon, will sweep into a stand of green timber, kill and dry out the dense green underbrush beneath the stand, and thus make more fuel for fires which often go into the tops and are then beyond control. The greatest menace to standing timber on the West Coast is the old slashings. Second to this is the campers and hunters, who not infrequently build fires against defective logs and then fail to put them out. Such fires can gather sufficient energy to dry out the green underbrush and start dangerous conflagrations.

The patrols of the Forest Service and private owners kept the fires well in hand until the middle of July. On the Oregon National Forest a fire started in the Santian country on July 19. This was the first of the bad fires, for although it destroyed little government timber and was soon under control, it caused loss of life. Three men in the employ of the Hoover Lumber Company in trying to recover their tools which were in the path of the fire were overtaken by it and killed. Later the Hoover Mill burned and set fire to surrounding timber. During the latter part of June and during July the forests were getting in serious condition and both the government and private timber owners were taking extra precautions to prevent the possibility of disastrous fires, starting. In spite of this, however, Supervisor Reid of the Colville National Forest early in July reported fires on his forests. By July 29 he reported thirteen fires burning and more starting every day. All available help was secured and the National Forest officers were tireless in their endeavor to handle the situation. Fires threatened on the north across the Canadian border and on the south from the Colville Indian Reservation. On August 11 the Forester was wired for troops as the situation was growing more serious and not enough experienced men could be had to handle the crews of green men, the only men available, brought in to fight the fire. Two

Forest Ranger R. M. Debitt and Crew, near Avery, Idaho

companies of troops left American Lake, August 13, for the Colville. Before their arrival, however, the rains set in and they were only required to assist in patrolling the fire lines to be absolutely sure that no fires started up again. In all, twenty-nine fires started on the Colville Forest this summer, burning over an area of approximately 100,000 acres of merchantile timber and causing a loss of 50,000,000 feet of timber valued at not less than $150,000.

Before the fires on the Colville Forest were fairly under control, the situation on the Crater in southern Oregon became serious and those on the Wallowa and Whitman forests assumed serious proportions. But the condition on the Crater was by far the most serious in the two States, for not only did the fires burn in heavy stands of valuable timber, but the lives and property of settlers were seriously threatened, and even a city was menaced. As on the Colville, fires on the Crater were scattered over the entire area and National Forest timber was threatened by fires burning on private lands outside the boundaries of the Forest. The surrounding country was drawn on to the fullest extent for help, but enough could not be secured. On August 19, 110 soldiers arrived at Medford, and on August 21, 250 more. These men greatly strengthened the force. Through the willingness of the men and the hearty cooperation of their officers they became at once an efficient fire fighting crew, which stayed with the situation until the fires were under control, September 9.

It was estimated roughly, for the timber has not yet been carefully cruised, that on the Crater alone timber to the amount of 140,000,000 feet, valued at $150,000 was burned, while, if the value of young growth killed is counted, the loss aggregated not less that $450,000. In all, over 110,000 acres were burned over. The loss on private lands adjoining the Forest was also great. It is not possible to say what this was, but it is certain that it also can be counted in hundreds of thousands. On the Crater alone over

Seventy-two Horses Were Packed Here for the Fire Camps

seventy-five small fires were extinguished by the rangers before they gathered headway. At one period of the fire danger Ashland, a city of 4,000 inhabitants, closed all of its business houses and the men assembled on the fire line to save the city. It is appalling to think what the situation might have been, and the great work done with an insufficient force, emphasizes how much more effective the protection might be made.

The conditions on the Wallowa, Whitman, Wenaha, Cascade and Umpqua were serious. In each of these forests valuable resources were destroyed and, but for the prompt action on the part of Forest officers, not only timber but other property valued at many hundreds of thousands of dollars would have been lost.

This is the most disastrous fire season the Northwest has ever known. It is estimated that in the two States of Oregon and Washington, one billion feet of National Forest timber has been killed by fire. Most of this, because of inaccessibility, will never be marketed. It is probably true, that the fires in the early 60's, which destroyed an enormous belt of timber along the Oregon Coast, were more destructive than those of this year. But in those days, while the timber was in reality valuable, it meant little to the citizens of that State. The loss would have been placed at a low figure as compared with that of this year. In 1902, Washington and Oregon suffered severely from forest fires, but they were relatively local. This year's fires have been general. No section has escaped and the total loss, if it is ever accurately ascertained, for both the government and private lands, will be staggering. Fires in Washington and Oregon have cost the Forest Service, for extra labor alone, $150,000, besides the patrols regularly maintained. In addition to this, private owners in both States have expended large sums both for fire fighting and in patrols.

The moral to be drawn is plain. We must always be ready for the unusual year. The losses of a year like the present would pay for protection for many years. Absolute safety must be

aimed at. It is better to spend money in preventing fires from getting under headway than in fighting large fires. During the dangerous season no fire guard should have a district to patrol which he can not cover easily in one day. The average area covered by each National Forest ranger in Washington and Oregon exceeds 50,000 acres. Not infrequently it is more than this.

In many instances the value of standing timber guarded by a single ranger exceeds $3,000,000, and when it is considered that these same men are also responsible for the prompt and efficient conduct of other National Forest business, the inadequacy of such a force needs no further demonstration. It is sufficient to say that good insurance on three million dollars' worth of property could hardly be had for $1,100 or $1,200, the salary of a ranger.

The National Forests of Washington and Oregon contain over one-third of all the standing timber in such Forests throughout the United States. Its value, conservatively estimated, is not less than $400,000,000. To properly guard this great national wealth requires adequate means of communication, trails, roads and telephone lines, and a sufficient number of men during the summer months to patrol the area properly. Trail and road building is here more expensive than in any other section of the United States, but the value of the timber warrants large expenditures, for it is the finest timber in the world. Provision for its proper protection should be made at once. The people of the United States can not afford to wait until disaster forces the necessity for such protection upon them. Here is a case where the door may be locked before the horse is stolen.

HOW TELEPHONES SAVED LIVES

By C. J. BUCK
Assistant District Forester, U. S. Forest Service, Portland

(From the Pittsfield (Mass.) Journal of October 5.)

(The following account of the fight against the destructive fires in southern Oregon demonstrates by experimental proof what the value of prompt communication is in emergencies such as are likely to arise at any time during the danger season in the rugged country of the West. Mr. Buck, who tells the story, is at present assigned as chief of the Office of Lands in his district, but assumed charge of the fire-fighting force, as described, when the need of good generalship became great.—Ed.)

"HOW telephones saved settlers from death in forest fires," is the attractive title of a story told by Assistant District Forester C. J. Buck in the *Oregon Sunday Journal* of September 25, when he returned from successful generalship of the southern Oregon fire situation.

The timber loss in southern Oregon was 800,000,000 feet on Government and private holdings, yet not a life was lost. It was the worst fire in northwest history, but telephones carrying warnings with electric speed warned the settlers and the hunters and the campers so that they got safely each time from the path of the devouring destruction.

There were fires that raced faster than a man could run and burned with such tremendous ferocity that green forests were completely burned. Where great trees had towered to magnificent heights, only smoking stumps were left. The breath of the flame in the canyon like a furnace heated seven times laughed derisively at the puny efforts of puny men to stay its course and reached out a menace of death, to enfold them.

Here and there were the isolated homes of lonely settlers; out in the woods were hunters; along the streams were fishermen. Over the country hung the smoke pall. The great area with its clustering towns and its scattered people had never known such a drought. It was as dry as the sands of Sahara where rains never fall. The sun had been shining down day after day its heat unbearable and the forests were like tinder, ready to blaze from a spark. The hot winds raged, too, day after day, ready to fan the spark into a roaring torrent of madly spreading fire.

This was the condition found by Forester Buck when he stepped off the train at Medford, going from Portland to respond to urgent calls for assistance. The people were almost scared to death. The country was so dry, the winds so high and so unceasing, and the smoke cloud so dense that no one knew just when the flame would reach out hungrily in his direction.

FIRES ALL AROUND

"Fires were buring at Mount Pitts, Anderson Creek, Wagner Creek near Ashland, near Butte Falls, on Clover Creek, Elk Creek, and at Cat Creek," said Mr. Buck. "There had been no preparation for so many fires. They were all unexpected. There were not by any manner of means enough of a fire-fighting force on the ground to handle the blazes, even had they been of the ordinary controllable sort. Confusion was added to apprehension by

Company G, 25th Regiment from Fort George Wright, Washington

reports constantly being received of new fires. I'm going to say frankly, now that the danger is over, that for a time we thought the whole country would go.

"To get an organization under such conditions was as imperative as it seemed impossible. Never at the best of the time could we get enough men to fight the fires and get the kind of a continued patrol we needed.

"Right here is where the telephones saved the day. In the Crater National forest the government has spent $3,500 in constructing 60 miles of telephone lines between the various outposts of the patrol rangers. We also had free use of such private telephones as there were. The fire situation was constantly changing. When a few hours before it might have been clear, a carelessly dropped cigar might have been fanned into a raging fire. At a point a little distant, where the fire had been serious, control of the situation might have been obtained. So by a constant system of telephone reports we were enabled to know where the need for fire fighters was greatest and to keep them moving accordingly.

"The fire at Deadwood, a small but serious blaze, will serve as an instance. Dead Indian, a few miles to the north, had been pretty well burned over, when in the middle of the night, news of the fire at Deadwood came. I found it possible to move men from Dead Indian and from Ashland at the same time by using the telephone. In 24 hours the situation was under control. Had messengers been trusted to bring the news, and other messengers been necessary to gather up the men and send them to the fire front, the blaze might have spread beyond all control. At Deadwood the settlers came near losing their property. Fire burned clear up to the back yards and the fire-fighting that was done, before the blaze could be controlled, was of the heroic kind.

THE WORST FIRE

"The worst of all the fires was on the South Fork of Rogue river. A for-

est officer told me that at a distance of a mile the roar of the flames sounded like an express train crossing a trestle near at hand. I do not believe another fire in this district destroyed so much timber. The total loss was not less than 350,000,000 feet, worth on the stump about a million dollars. Here the flames, racing through the tree tops when the wind blew at all, spreading along the ground when the air was calm, burned down the green timber, absolutely destroying its merchantable value.

"The pick of Jackson county timber, to be brief, was destroyed. Much of it was in private ownership.

"Two companies of soldiers were sent to help the local fire fighters. They spent a good deal of their time protecting the settlers' houses, but they did splendid work. Unorganized work on the Rogue river fire would have done little good. The thing that puzzled them most was the way the fires spread. They arrived first at the northwest corner of the burning area then began the work toward the east, trenching and back-firing.

"Occasionally they sent ahead to learn how the fire was spreading. In the morning it was about a mile ahead of them. This gave confidence. They thought by night they would surely have caught up. Night came, and imagine the chagrin of the fighters when they found that the blaze was five miles ahead of them. It was burning around them and coming back toward them. It was then found necessary to immediately move camp a distance of 12 miles before they could get at the fire front. But there is no doubt that the soldiers saved in this locality 300,000,000 feet of timber. They certainly earned their transportation and their wages many times over.

"As much could be said for all the soldiers sent to fight fire in the Crater forest. They worked as hard as men could work, unmindful of the danger or the exposure. Some of them pleaded that they might be allowed to work extra hours in order that there might be a greater certainty of bringing the flames under control.

PRAISE FOR THE SOLDIERS

"Particular credit is due their commander, Major Martin, for the masterly way in which he handled his men. He inaugurated a system of keeping in close touch with all points of danger that was well nigh perfect. He cooperated closely with the Forest Service. He kept in constant communication with me, so that he might know where to send his men to work the most effectively. It would take a long time to tell how they worked eagerly and uncomplainingly, with perfect system and discipline and with organization impossible to the volunteer fire fighters or to the laborers that we hastily employed.

"To say that no lives were lost does not imply that there was no danger. Ashland was in serious danger. It was a wild and dramatic time when the fire bells rang and the people assembled on the public square. No wonder the faces of the men grew pale as they heard Ranger Gribble tell them that if the wind kept blowing, their homes and the city might go.

"Ashland, understand, is a fine little city of between eight and ten thousand population. But from the edge of the town to dense timber is not more than a mile and a half. There is a great area on other sides of the town that is overgrown with brush tremendously inflammable in such a season as this. The business men closed their stores and went out to fight fire in the forest. They did good work, for they were fighting for their families and their property. A foggy day came, when in other places it rained, and the fires subsided. Fear was relieved, the tension relaxed. Then the wind came again, and again the town was in danger. So the people fought their battles against the fire fiend all over, and they won.

"In the office there was press of business and dramatic scenes. It was like headquarters in war time. I talked on the telephone on an average of six hours a day. When I got away from that job I had scarcely any voice left.

"Telegrams poured in from every part of the United States. They were inquiries from people who had friends out in the forests. These had to be answered. A local paper printed a story about settlers being endangered. A man stumbled into the office, his face blanched. He could not speak. In his hand he held a copy of that paper. 'My family is there,' he finally gasped. It took a lot of work to reassure that man and send him on his way again.

"Up at Mosquito Ranger's Post, Mrs. Holts, the ranger's wife with her children were hemmed in by the flames. For a while we thought them burned. But finally they got out alive. But it would be hard to picture the grief and the worry that attended all these things.

"There were so many reports of lives endangered, lives lost, settlers, fire-fighters and hunters hemmed in by the flames, that we never knew what to believe. It was such a time as a man never forgets.

THE FIRES' LESSON

"Now that the danger is past, we who fought the fires are left with certain conclusions concerning the way in which the situation must be handled another time.

"There must, in the first place, be better fire protection. More rangers are needed. This not alone for the southern Oregon country. No one can tell where the fire will be worst next year.

"Crater national forest has an area of over 1,000,000 acres. At the time the fires broke out there were between 25 and 30 rangers for the whole vast area. There should at least be a ranger for each township of 36 sections. There should be more complete provisions for the reporting of fires. The telephone service, such as we had, undoubtedly was the agent of preservation from double the destruction recorded. But there should be at least 250 miles more of telephone lines. This costs $60 a mile—cheap compared to the value of the service.

"The most essential thing in forest fire fighting is getting men on the ground. Ten men to handle the blaze in its incipiency are worth more than 200 after the flames gain headway.

"And, of course, the great thing in preventing destruction of forests by fires is precaution. Campers and hunters set most of the blazes. There seem to be indications in southern Oregon that some of the forest fires were purposely set. Some of them originated in slashings. But the people tell me that when they have learned of a hunter or a camper moving from their vicinity they go to look at the site of his camp, and, ten chances to one, they will find embers, which if caught up by the wind constitute the beginning of an uncontrollable fire."

Assistant District Forester Buck is accredited by the people on the ground who watched his work and by others who know of the menace of the fires with having given an almost superhuman service in preventing greater destruction. It was a time when a man needed to keep his head cool and his mind working rapidly. Order needed to be worked out of confusion. This the assistant district forester did. Had it not been for his work undoubtedly the timber loss, great as it is, would have been doubled.

FOREST FIRES IN WASHINGTON

By JOEL SHOMAKER
Chairman, Washington Conservation Commission

The State of Washington has passed through another ordeal of forest fires. Thousands of acres of standing timber have been burned over and the country left in ashy desolation. Large areas of young forest growth have been wasted, and soil fertility consumed, by the unnatural burning process. The loss to life and personal property has not been so great as in adjacent States, but the total waste resulting from fires will reach almost the highest point in the records of State history.

My own experience will give an illustration of what has taken place in other sections. On July 3 a fire was noticed in an isolated spot on my Nature Nursery. It had been started in the débris left from loggers, several hours before I discovered the smoke, as I live on the waterfront of Hood Canal and the fire was set far back on the upland. It had made such a start, when fighters arrived, that nothing could be done but watch the marching path of destruction.

That fire continued its trail of annihilation for about two months. I worked day and night to save my own property, and many others labored to prevent conflagrations in both private and public property. I place the loss to my nursery, in timber, young forest growth, plants and shrubs, waste in soil fertility and destruction of scenery, at $10,000. It burned over nearly 200 acres of my land and extended far out into the neighboring country.

The season was favorable for fires, as it is said to have been the driest summer in twenty years. I patrolled the borders of the fire approaching my dwelling, and, with shovel in hand, checked the flames for a time. But nothing but water did any good. When the family had been aroused to take the boat, and trees were falling all around the house, we put a stop to the flames by using water, carried by hand from the bay, and cutting trenches to prevent burning leaves from crossing.

Other fires in my vicinity did much damage to the forest and soil and threatened homes and settled communities. In some districts the fires extended into towns and the danger became so great that Governor M. E. Hay issued a proclamation calling on all loggers to cease operations for twenty days and set their employes to work in trying to put out the flames. Appeals were made to the War Department for assistance in bringing rain, by firing guns, at different ports on the shores of Puget Sound.

It was feared that a repetition of the "Black Friday" of 1902 would be witnessed, and the President of the United States was asked to help in bringing rain. Troops were called out from the annual encampment and sent to different sections of the Northwest to aid the forest rangers in saving timber and valuable properties. Smoke covered the land and waters, and navigation was impeded in the same manner as during the raging fires of 1902. August was a critical month, and but for showers at the close of the month would have been a time of wonderful waste and destruction of timber, watersheds, and native resources.

What caused the forest fires? That question is always uppermost after the country has been laid waste. As I see it, forest fires are synonymous with ignorant and malicious mischief. It was the custom of Indians and some pioneers of Puget Sound to set fire to dead brush in order to clear deer trails, burn

over patches for wild blackberries, or open places where grass could be grown for pastures. In some instances, it is asserted, parties took the fire plan for getting even with land owners and others. Again, it is stated that men set fire to timber in order to obtain work, at 30 cents an hour, fighting the fires.

The wasteful methods of logging may be held responsible for the origin of many fires. Loggers take out marketable timber in the easiest and cheapest way possible. They fell trees in all directions and leave the limbs and branches where they fall. They knock down enormous quantities of young timber and thereby leave slashings for fire, whether it comes as an accident or for other purposes. No efforts are put forth by the average loggers to guard the property of the land owner or the surrounding citizens. They simply skim off the cream and kick over the bucket to prevent others from securing benefits from the remnants.

Clearing land by burning slashings is one prolific source of fires. That method appears to me to be an obsolete, dangerous, and slovenly way to clear logged-off land. I would not slash and burn any portion of my land, nor permit others to do so. It destroys the soil fertility that every farmer needs and must replace at much expense. There is no time gained by resorting to such methods. The slashing burner endangers his own property and that of his neighbors unnecessarily. The only way to properly clear land is to cut the brush and logs, pile in the right condition, and burn under safe restrictions. Our forefathers cleared land that way, and they lived and prospered and did not menace others.

Many valuable lessons may be gleaned from the forest fires of 1910. One of the first is the wise, efficient, and capable system of the United States Forest Service, exemplified in the national forests. The plan adopted by that branch of our government for protecting the forests and conserving their resources for use now and in the future, is most commendable. And the men engaged in that department are entitled to all the praise the people of Washington can bestow for their heroic efforts in behalf of the government and the people comprising the nation. They make it possible for mature timber to be removed without damage to the growing forest, and encourage the spirit of national conservation.

A system of patrol for national, state and private forests, similar to that introduced on the reserves, should be adopted everywhere that trees are grown for use, now or hereafter. It is too late to lock the stable door after the horse is stolen. And it is generally too late to stop a forest fire after it is once under good headway. The remedy lies in preventing the blaze in its incipiency. Some men will set forest fires, in unguarded places, so long as the world stands. Some men will get drunk so long as liquors are manufactured, regardless of the wants of their families. We need laws that will curtail the destructive forces in depraved manhood, in the forest and saloon.

In Japan the man who plants a tree for posterity is considered a philanthropist, while in the United States the man who destroys the native forest, in quest of present money, and is successful, is held up as a capitalist. It is just as sensible for the orchardist to cut down his trees to harvest the fruit as for the logger to waste the young forest in removing the marketable timber. The Forest Service is trying to remedy this evil. It should be upheld by every loyal American citizen, and its plans should be adopted everywhere that timber is a commodity.

The Washington Forest Fire Association is an important factor in saving the timber of this State. It works in harmony with the warden system, provided for by the state legislature. They cooperate with the timberland owners, and assist materially in preventing fires and stopping the course of those which get from under control of private parties. But both organized forces need more assistance from the state and nation. They cannot perform impossibilities. A fire warden cannot be in many places at the same time. Their powers

Big Creek Fire, Where Thirty Lives Were Lost

should be enlarged and their duties extended to cover broader educational fields of labor.

Conservation of natural and national resources is a national question of more importance than any issue before the American people. It forms the foundation of present and future agricultural and commercial prosperity. If handled correctly it will make of the State of Washington one of the greatest commercial divisions in the world. If neglected, or corrupted through political manipulation, it will result disastrously to the entire people. It is a question in which the homeseekers and investors of the entire nation should have a common interest.

The forests should be held sacred for use, now and in coming years, and not wasted or destroyed by any forces, either private or national. They contain the sources of power for developing the country, and that should not pass from the control of the whole people. They hold the reservoirs for supplying water for irrigation and domestic purposes, in the valleys of industry, and should be guarded by all the people, for the benefit of all the people, and not for the enriching of corporate interests in furnishing the necessities of the people, in order to make money from monopolies in things the people must have to insure continued prosperity.

TWO MILLION DOLLARS WORTH BURNED IN ONE DAY

By GEN. C. C. ANDREWS

State Forestry Commissioner of Minnesota

(If yet another proof is needed to show the necessity of full patrol against forest fires, here it is. September 1, General Andrews tells us, the ranger service in Minnesota was discontinued for lack of funds. On that very date a Minneapolis newspaper stated editorially that the fires in Minnesota forests had already destroyed property this year whose money value would have sufficed to cover the cost of the proposed extension of the state ranger service for 50 years. And as early as July 22 press reports from Bemidji tell of the dangerously dry condition of the forests in the region devastated on October 7.—Ed.)

AT THE request of *American Forestry,* Gen. C. C. Andrews, state forestry commissioner of Minnesota, made the following statement, under date of October 13:

The disastrous forest fire in Minnesota on the 7th instant in the vicinity of the Lake of the Woods and Rainy River was driven by a tornado, and destroyed the villages of Baudette and Spooner. The loss of life probably will not exceed fifty; the number now known to have perished is twenty-nine. I am unable now to estimate the loss of property, but am convinced it will exceed $2,000,000. The area of the fire probably did not exceed 300,000 acres.

The country swept by the fire is generally level, covered principally with Norway and jack pine, spruce, balsam, white birch, and tamarack. It is traversed by the Canadian-Northern railway and is mostly destitute of wagon roads. While quite a number of new settlers are scattered through the country, there are as yet only about six organized townships in what appears to have been in the track of the fire.

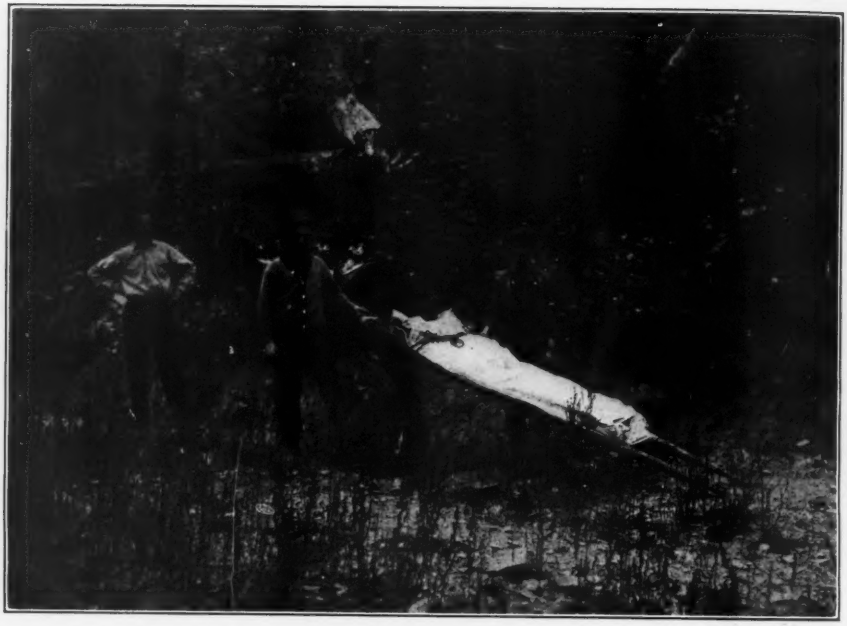
Considerable timber had been cut in the region and much brush and refuse left unburned. The whole season from April 1st has been remarkably dry. Numerous fires occurred which were fought by the settlers; some of the fires burned into bogs and probably all of them were not wholly extinguished.

Just where and how this fire originated I am unable to say, but the latest reliable information I now have is that it came from south of the Canadian-Northern railroad.

In some cases the land of a new settler in such a region may be partly covered with refuse from logging or windfalls, which he is strongly tempted to burn in dry weather. The country is also more or less frequented by other persons who are liable to cause fire.

How shall we prevent the negligent use of fire in the forest? By our present system in organized townships the three supervisors and clerk are fire wardens; they are paid 25 cents an hour for the time they are employed; they are expressly required to take energetic precautions to prevent fires and may call help to control them, and every person called upon to help must do so unless he has a justifiable excuse. Wardens can be specially appointed for unorganized territory, but it sometimes occurs that in such territory there is not a suitable resident for the position. Fire fighters are paid 20 cents an hour for their time.

Wardens, in a dry season, may patrol their districts or employ patrols. The minimum penalty for setting fires



A Fire Victim on an Indian Travoy, Avery, Idaho

which endanger the property of another in the vicinity of forest land, is now $50. Offenders have to be be tried by local magistrates, who are often too lenient. The plan followed in in this state has been to enforce the law severely, and prosecutions have been instituted whenever sufficient evidence has been found.

The employment of rangers to go through their respective districts to assist, inspect or compel the activity of fire wardens is authorized, but the appropriation for such service at present does not admit of the employment of a sufficient number of rangers nor for a sufficient period of time. For lack of money, ranger service had to be discontinued the first of September. Whether if they could have been employed longer this recent calamity would not have occurred, no one can positively say.

I think it would be an improvement to our system of preventing forest fires if we require that in logging the branches of at least the coniferous trees be lopped and burned at the time of cutting, when logging is done between the 1st of November and the 1st of April; also that we have adequate means for the employment of competent patrol or rangers; and further, that we copy the New York law requiring railroad companies to maintain efficient patrols between April and November, and in case of their failure to do so, that the state do it, at the expense of the railroad companies.

FIRES ON THE FLATHEAD FOREST IN MONTANA

By H. H. CHAPMAN

Assistant Professor of Forestry, Yale Forest School

The fact that many of the fires in the west this summer were set by lightning is often questioned by those unfamiliar with western conditions. But there are very few rangers who have not had practical demonstration of fires from this source.

The writer was employed in the Swan Valley east of Flathead Lake during July and August, and can testify to the truth of this fact. On July 3, at 4 p. m., after several weeks of dry weather, we had a thunder storm of half an hour's duration, with a heavy down-pour of rain. A few minutes after the storm passed, the ranger called our attention to a smoke about a mile off. This was located in the heavy timber, and was found to be a dead larch tree which had been struck and was blazing from top to bottom. It could not be cut down, so was allowed to burn off and was then ditched around for its whole length. No water was available to put it out, and dirt thrown on it did not quench it. The tree burned for over two weeks, during which time it was a constant menace. The fire followed the roots for distances of 8 or 10 feet and would reach the surface outside of the trench. The place where this occurred was 75 miles from the nearest town and only its prompt discovery and constant watch by the ranger prevented it from developing into a fire that would have swept the whole valley. It had two months in which to spread before any rain came.

And the fourth day after this storm a heavy smoke was seen on a mountain spur twelve miles distant. There was no trail and we started the following morning with pack horses through the timber and reached the fire late that afternoon. Fortunately there had been no wind that day and the fire was smouldering. It covered nearly two acres in a long strip where the wind of the day before had blown it up the shoulder of the ridge. At the lower end of the burn was a dead larch tree with a fresh lightning scar.

The location of the fire made it impossible that any person could have been there for any purpose whatever, and the position of the lightning-scarred tree coincided exactly with the probable center from which the fire had had traveled to spread up and down hill. So that while no one saw this fire start from lightning as in the case of the first fire, the evidence is just as convincing. The bolt had not set this tree on fire, but had ignited the dry duff at its base. This had smouldered for three days, and had been finally fanned into life on the fourth day after the storm.

Owing to the inexperience of a fire guard employed to watch this fire, it broke out three times after it had been completely subdued and surrounded by trenches and was still burning when rains came in September. It had been confined to less than two hundred acres in area. If allowed to run it could have burned over from 20 to 100 square miles. No other fires occurred in the valley all summer except those set by lightning.

Fires of this character usually start in some remote spot that cannot be reached promptly by the ranger because there is no trail and it is absolutely nec-

essary to take horses in to carry food, bedding, and tools for fire fighting. A trail must either be cut out to a point near enough to reach the fire from camp or the horses taken slowly and painfully trough country covered with tangles of down timber and dense thickets, with the risk that in case the fire got well started there might be some difficulty in getting out again. Meanwhile the fire is gaining headway, and the ranger finds on reaching it that he can make no impression on it and needs 20 to 50 men to control it. He proceeds to the nearest telephone station and the men are sent in from some town, or in rare circumstances they may be recruited from settlers nearby. Their beds, provisions and cooking outfit are packed in 20 to 75 miles on animals hired for the purpose, and after a delay of from 3 to 7 days they reach the fire.

By this time it is so large that they cannot entirely subdue it, but can only check its progress, head it off, gradually surround it, and, if rains come or the wind does not blow too hard, hold it within narrow limits. Then, sooner or later, a high wind is sure to occur, and these smouldering fires leap up and across the trenches and sweep over wide areas in a single day.

In the South Fork valley, east of Swan Valley, an area of 110 miles long had to be protected by a force of guards so small that it was impossible for them to at once reach and put out fires starting from such causes. One fire which resulted from the carelessness of a half-witted youth who was hunting in the mountains, got such a start that a crew was necessary.

This crew was sent in accompanied by fifty pack horses, but had to stop on the way to control three other fires, and the first fire before they could get to it, had burned over a township. The ranger in the Swan Valley had instructions to look up this youth and escort him out of the forest, and would have done so had it not been for the fires set by lightning in the Swan Valley, which prevented him.

On the west side of the range a similar situation developed. A fire got away from the ranger through the impossibility of his reaching it in time. This fire was burning during the week preceeding the great fire in Idaho. The same wind that caused such destruction there, blew this fire across the timbered summit of the range and swept it down into the valley with a fury that made all attempts to stem it hopeless for the time. Burning brands and bark were blown across the Swan River and fires started for three miles along the further bank. By great good fortune this wind was followed by rain which enabled us to attack the fire, and by ten days' work with 20 men who were already on the ground its further progress was prevented.

This in a small way illustrates the conditions which caused the larger conflagrations in Idaho. Wherever fires were set in low ground, along railroads and trails, in inhabited districts, they were controlled promptly. But, largely through lightning, many fires were started that could not be reached. These fires, on the day of the great wind, swept down on the protected areas in solid fronts miles in extent and destroyed the work of weeks of fighting.

When the national forests are provided with complete systems of trails, when enough men are employed to reach and control fires as soon as they start, and when, by the operation of the Forest Homestead Act and the development of transportation, vast stretches of wilderness become populated as far as their resources will permit, the conditions that proceeded the great fires of 1910 will have been brought fully under control, and a repetition made impossible.

THE PROTECTION OF FORESTS FROM FIRE

By HENRY S. GRAVES
Forester, U. S. Department of Agriculture

Part III—Continued from October number

Burning Brush Piles

An excellent time for burning brush is after the first snow of winter. (Pl. IV.)* This is usually a light fall, and the snow does not penetrate the compact piles of brush sufficiently to prevent burning. There is no danger of the fire running on the ground, and the branches of the standing trees are so damp as to prevent injury by the rising flames. If the brush is burned before winter, it should be only during damp weather, when the ground is so wet that fire will not run easily.

When large areas of piled brush are to be burned the work should be organized with care. It should never be undertaken when there is a strong wind, and the best time is in calm weather. If there is any wind, the burning should begin with the piles on the lee side. Several piles may be fired at one time, but they should be some distance apart, with one or more unburnt piles between them. When the first fires have been burned down to coals, the intermediate piles may be ignited. This alternating method of burning the piles prevents the injury to trees and young growth between the piles that might result from the collective volume of heat of adjacent fires. Just as the brush on level ground is burned against the wind, so, on a hillside, the piles near the top are burned first, and the work progresses down the slope.

Whenever large areas of piled brush are to be burned, a sufficient force of men, equipped with fire fighting implements, should always be present to insure that the fire will not get beyond control. In some instances, when brush is piled in the winter during logging and left for later burning, the piles become very wet from the snow and rain and do not dry out till late spring or summer, a time when burning on a large scale is dangerous. If the brush of winter lumbering can not be burned as the logging proceeds, the piles must ordinarily remain unburned till the first snow of the following winter, or till especially wet weather comes in late summer or fall.

The devices used in different localities for starting fires in piled brush are many. Some loggers use a torch of burning wood, as resinous pine; others cary live coals from one pile to another; others use a long-handled torch; others, again, pour a little oil on the brush and start it with a match. The most satisfactory seems to be an ordinary tubular torch with wicking and a ferrule into which a rake handle can be inserted. A good substitute, though a crude one, for the last is a piece of bagging or burlap wound around an iron rod or stick of wood and occasionally saturated with oil.

The cost of burning piled brush in the coniferous forests may vary from one to thirty cents per thousand, according to the manner in which the brush is piled, the condition of the brush, the size of the crew needed to prevent the running of fire, etc. Commonly, it ranges from five to fifteen cents per thousand feet. Where the

*Plate IV appeared in the October number of AMERICAN FORESTRY.

Plate VII, Fig. 1—A Mountain Trail Built for Fire Patrol

cost has been higher than this, it has been attributed either to poor work in piling or to inefficient management in the work of burning. The average cost of both piling and burning should range in coniferous forests between ten and fifty cents, and as the lumbermen become more experienced in performing the work the cost will be correspondingly reduced.

In the logging operation shown in Plate IV, where the brush was burned just after a slight snowfall under particularly favorable conditions, the actual cost of burning was only a fraction of one cent per thousand feet. No watching of the piles to see that fire did not run was necessary; it was simply a case of walking from one pile to another and starting the fire.

In some coniferous forests careful records were kept of the area actually burned over. Where the stand per acre ran from 10,000 to 50,000 feet per acre, the aggregate area burned over by the brush fires was found to be approximately seven per cent of the total area cut over in the logging operations. Where the brush is burned as the logging proceeds, the percentage of the area burned over is less.

Disposal of Hardwood Brush

Most of the work of piling and burning brush has been in coniferous forests. Of late, however, there has been considerable discussion of burning the slash after logging in hardwood forests. So far as the author is informed, systematic brush burning after hardwood logging has not been conducted anywhere on a large scale or in a manner to justify a judgment as to its practicability. Hardwood tops are necessarily large, heavy, and awkward to handle. The cost would be much greater than in coniferous forests. It is probable that lopping and scattering will be used rather than piling and burning.

The author has conducted some experiments in the burning of hardwood brush in the second-growth forests of New England, where the wood was utilized to about three or four inches, so that the amount of brush to be disposed of was much less than would have remained from logging old timber in the ordinary manner. The results of these experiments showed the average cost of piling and burning to be between ten and twenty-five cents per cord. In this class of material with good organization the cost would probably not exceed ten to

Plate VII, Fig. 2—A Plowed Furrow that Stopped a Surface Fire

fifteen cents per cord, though these figures furnish but scant basis upon which to make calculation of the cost of piling and burning the brush and débris from an ordinary hardwood logging operation, where the size and number of the limbs would be very much greater.

Lopping of Tops

In some forests the burning of the brush may be unnecessary or actually undesirable. A method of brush disposal applicable in many forests is to lop off the branches from the tops and leave the material on the ground. The purpose is to bring all the brush in close contact with the ground, so that it will absorb moisture more readily, dry out less in summer, and decay more rapidly than when propped high above the ground.

So far as the author is informed this method was first used on an extensive scale in the Adirondack Mountains in lumbering spruce and pine. At first the plan was to cut off only the upper branches of the top as it lay on the ground. This left the stem still propped above the ground. (Pl. VI, fig. 1.)* The next step was to cut off the under branches and lower the whole mass to the ground. The heavy snows during the first winter after cutting flattened down all the branches. (Pl. VI, fig. 2.) In this condition the brush absorbs moisture so rapidly that after three years there is little risk of fire.

This method was first used in private shooting preserves, mainly to prevent the tops from obstructing the hunter's view. It also enables a freer movement over the ground and facilitates the fighting of fires.

A later development of the method is to cut up and scatter the branches about over the ground. This has been used in the cuttings on second-growth woodlands when the amount of material left after cutting the cordwood in the tops was small. It has also been extensively used in certain National Forests in the dry districts of the West, where the scattered branches serve as protection to the soil and aid reproduction.

*Plate VI appeared in the October number of AMERICAN FORESTRY.

Plate VIII, Fig. 1—A Fully Cleared Fire Line in the San Gabriel Mountains

The cost of lopping the tops of spruce in the Adirondacks was twelve cents per thousand feet of lumber cut.

Lopping is the most advisable method of brush disposal under the following conditions:

(1) Where there is very little danger of fires starting.

(2) Where the region is moist and the branches will absorb moisture quickly.

(3) When the forest is so dense that piling and burning is impractical.

(4) Where the custom of logging and of utilizing the crown is such that the greater part of the tree is utilized and but little crown is left, while what is left will not be especially dangerous if thoroughly lopped and scattered.

(5) Where the scattering of the branches is necessary or desirable to protect the soil and small seedlings from drought or frost.

Broadcast Burning

For a number of years it has been the custom of certain lumbermen to burn their slashings, in order to protect valuable standing timber on neighboring areas. There is usually no attempt to regulate the fire within the area burned, and all living trees and young growth upon it are destroyed along with the brush and débris. From the standpoint of forest production such fires are very destructive.

The principle of broadcast burning may, however, be used to advantage in making clear cuttings, provided the fire can be confined to small areas and fully controlled. Thus, in making clearings in patches and strips in certain of the National Forests, the slashings are burned on the ground without piling. This method is now under trial in some of the clear cuttings in the northwestern National Forests, where, in addition to the slash from the cuttings, there is a great accumulation of débris and the litter and humus is very heavy. In some instances this débris and litter is a hindrance to reproduction, as well as an invitation to fire, and its destruction is beneficial. The heavy loss of humus which must accompany so hot a fire may be more than counterbalanced for the forester by the improved conditions for reproduction of the species desired. The expense of piling all the slash and débris would under these conditions be very large, probably not less than

Plate VIII, Fig. 2—Location of Fire Lines in the Angeles National Forest, Cal.

from $1 to $2 per thousand feet of timber cut.

In order to control the fire in burning over the ground broadcast, ample fire lines should be constructed around the outside of the areas to be burned. These should usually be not less than one rod wide and should be entirely cleared of inflammable material. The material in the lines may often be thrown on the side of the cut-over area and burned with the other débris, but if this would make a dangerously large pile near the line it is better to burn it in piles on the cleared space.

The burning should be done with great caution. A time should be selected when the slash is dry enough to burn well, but not so dry that it will be impossible to confine the fire within the fire lines. The best time is usually when the slash in the open, cut-over area has just dried out sufficiently to burn, and while the contiguous forest is still too damp to burn freely. In the case of wide, cleared strips it may be advisable to construct a fire line through the middle, as well as along the edges. Very often the logging trails can be used for intermediate fire lines for the control of the burning, and in this way the expense of making special lines may be partly saved.

In the work of burning it is usually advisable to have a crew of at least ten men, properly equipped with fire-fighting implements, in order to control the fire. So far as possible only small portions of the area should be under fire at one time, especially when there is any possible danger of the fire spreading to the adjoining woods.

There is no question that this method is much more dangerous than burning brush in piles, and for this reason the latter method should be used whenever possible. A great objection to broadcast burning is that any remaining trees, reproduction, or young growth, already started on the cut-over area, are almost inevitably destroyed.

Annual or Periodic Burning of Litter

In many places, notably in the pine districts of the South, it has been the custom to let surface fires run through the woods every year, usually in order to improve the range. This is defended on the theory that if the litter is allowed to accumulate for a number of years,

Plate IX, Fig. 1—Fire Line Cleared near Railway

a fire would be so severe as to kill all the timber, whereas an annual fire burns only the year's fall of leaves or needles, and does little damage to the standing trees. Where the trees are tapped for turpentine the litter is raked away from the boxed trees so that the fire will not reach them.

There is no question that in the unprotected yellow-pine forests this custom has resulted in saving a large amount of old timber, but it has also retarded the reproduction of the forest by killing off young growth and seedlings in their tender stage. Deliberate burning of the litter as a protective measure is justified only under special conditions and only on selected areas. The considerations bearing on the use of fire in this way are:

(1) It should never be used except where absolute fire prevention can not be assured and there is real danger resulting from heavy leaf litter.

(2) It should be used only in stands in which there is no reproduction that it is desired to conserve.

(3) It should be used only where the benefit in fire protection more than offsets the injury to the soil resulting from repeated burnings.

(4) It should be used only with very fire-resistant species.

(5) It should be used only when the trees are old and large enough to have developed the corky bark necessary for resistance to the heat of the fires

(6) It should be used only when the fire can be controlled.

The burning is done best in early spring, when the loose litter is dry but the ground below is damp, the purpose being to burn only the upper litter.

In many places it is very difficult to control the burning without the use of fire lines. A tract divided by roads and paths into small blocks presents a simple problem, for each block may be burned separately, and there is no danger of the development of a fire too large to control. On large tracts without roads, ground-cleared fire lines may be used to protect areas of young growth, or they may be developed at certain points to aid in the control of broadcast burning.

Annual burning for fire protection is never justified where it can not be systematically controlled. The practice in many parts of the South and West, of setting out fires to burn off the litter and brush, usually for the sake of a better range, can not be justified, for the fires are uncontrolled; and they destroy an immense amount of young growth and otherwise damage the for-

est. Merely setting fire to the woods without control is nothing less than forest destruction.

FIRE LINES

Broadly speaking, a fire line is a cleared strip in the forest used as an aid in the protection from fire. It may be a road, a trail, a river or stream, a line cleared especially for a fire break, or a plowed furrow. The purpose of fire lines is to check or stop fires and to facilitate fighting them. A small surface fire may be stopped entirely by a road or even a path. Some surface fires are easily checked in their progress by narrow fire lines; others can be stopped only by very wide lines. Crown fires and surface fires of unusual severity will readily leap across even very wide fire lines. Fire lines, therefore, should not be built with the idea that they will *always* stop fires. They are intended to serve primarily as an aid, and often are an indispensable aid, in controlling fires and preventing their spread. Even when they do not actually stop or check a fire they serve as vantage points from which the fighting crew may work. Their establishment usually makes the woods accessible, so that a crew can get to a fire or near it quickly with appliances for fighting it. If back-firing is necessary it can often be done best from the fire line.

Fire lines differ very greatly in construction and width, according to local conditions of fire danger and of special forest organization. They will be discussed under the following heads: (1) Roads; (2) trails; (3) special fire lines.

Roads

An ordinary dirt road ranks as one of the best of all fire lines. The wider the road the more effective it is. A forest well cut up with roads is, therefore, much more easily protected than one with few or no roads. In Europe every well-organized forest has a thoroughly planned network of roads. These are located primarily with reference to the problem of logging, but they serve also as a network of fire lines, and special lines are cleared to supplement them where necessary. Every part of the forest is readily accessible not only for patrolling for fire during the danger season, but for the quick transportation of fire-fighting appliances. In case a fire should start in this forest and be discovered within a reasonable time it would be easy to confine it to a small area.

We can not expect to have such a well-organized system of roads and fire lines in our forests for a long time, but much can be done in the way of utilizing the more or less temporary roads that are used in logging and afterwards abandoned. This is particularly true in the second-growth woodlots.

In most woodlots there are a great number of old wood roads, often badly overgrown with weeds, brush, or trees. If these are kept clear they are of great value in fire protection. They make the different parts of the woods accessible and offer points from which the fighting crews may work. The author has in mind a tract in Pennsylvania which was burned over in 1909 with great loss, but which might easily have been saved had the old roads been clear.

It is usually impracticable, on account of the expense entailed, to keep all the roads free of leaves, grass, etc., but they may be kept brushed out with very little cost. The author recently had some work of this sort done on a Pennsylvania tract, eight years after abandonment of the road, for less than $3 per mile. It may not always pay to repair bridges and restore badly washed roads, but in almost every second-growth woodlot most of the overgrown roads may be reestablished sufficiently for fire lines with very little cost.

Trails

The first object of trails is to open up a forest and make it accessible for patrol and for fighting fires. In the National Forests this work of trail construction constitutes the first step in

Plate IX, Fig. 2—A Fire Line in the Adirondacks

organizing for fire protection. In undeveloped mountain regions it is impossible without good trails to get to a fire in a reasonable time and with means for fighting it. The trails in the National Forests are permanently constructed and are designed for saddle and pack horse travel. (Pl. VII, fig. 1.) While their first purpose is to facilitate patrol and access to a fire, they may be used as starting points for backfiring, and will often check or actually stop a small surface fire.

Special Fire Lines

When there are no roads or trails which will answer the purpose, it may be advisable to construct special fire lines. (Pl. IX, fig. 2.) Special fire lines are necessarily expensive, and are used where the property to be protected is very valuable. They are most used in woodlands in the better settled portions of the country, where land values are relatively high. In many cases it is advisable in a valuable woodlot to construct here and there a special fire line at points where it is not worth while or practicable to build a road or trail. Thus, special lines are frequently run along the boundaries or at strategic points connecting roads. It is a sound principle, however, that special fire lines should never be built where a road or trail can be used for the same purpose.

In the less intensive forest conditions, such as occur in the lumber woods, special fire lines have so far been constructed only under exceptional conditions. In a large forest, the first work is to open up the area for communication by the construction of trails, and, where possible, of roads. Like all other work in forestry involving an investment, the use of fire lines must be based on sound business principles. They should be used only where necessary and where their expense is justified by the returns.

Special fire lines may be classed under the following heads: (*a*) Fully cleared lines; (*b*) tree-cleared lines; (*c*) ground-cleared lines.

Fully Cleared Lines

The ideal fire line is a completely cleared strip, from which are removed

not only the trees and brush but also all ground débris down to the mineral soil.

Fully cleared lines are advisable when the risk of fire is very great, and adequate protection can be secured only by having a clear break which will either stop or check possible fires. Such lines are necessarily expensive to construct and maintain. They are, therefore, used only when the property is valuable and the damage from a fire would be very great, as, for example, to protect nurseries, plantations, or valuable blocks of timber.

They are especially necessary wherever fire will run swiftly and it may not be possible to reach the fire promptly with fighting appliances. A conspicuous example of the necessity of such fire lines and of the service rendered by them is found in the chaparral zone of the mountains in southern California. (Pl. VIII, fig. 1.) The preservation of the chaparral cover is of great importance in protecting the local watersheds. The area is large, the mountains are rough and difficult to travel, and fire runs with great rapidity. Fire lines are very necessary in such localities to control any fires that may start, and they must be of a character to stop fires, or to check them to such an extent that they can be controlled. The Government is, therefore, building extensive trails for patrol to prevent fires, and supplementing them by wide, cleared fire lines to stop any fires that may start.

(*To be continued*)

RANDOM TALK ON FOREST FIRES

ONE of the telling points made by Gifford Pinchot in his address at the recent congress at St. Paul was this:

"When any great movement has established itself so firmly in the public mind that a direct attack on it will not pay, the regular method is to approve it in general terms and then condemn its methods and its men."

In the State of California, for instance, this is precisely the way in which certain interests that would like to discredit the national forest policy as a whole, but despair of doing so because it has the solid endorsement of the people, are at present seeking to discredit its methods, particularly its methods of fire protection. These interests are of two classes; the great combinations of capital which are fighting against any control of national resources, and certain private and corporate owners of timberlands within the state. It is the latter class which has recently worked up an organized attack upon the whole principle of protection against forest fires as practiced by the national and state governments.

This attack is well illustrated by an article in the *Sunset Magazine* for August, signed by George L. Hoxie, who had as collaborators, the editor states, S. O. Johnson and G. X. Wendling. All of these men have exceedingly widespread interests in California timberlands. Mr. Hoxie's article attacked the Forest Service for trying to keep fires out of the national forests, and advocated what the author terms employing fire as "a servant" to burn over the forest floor so as to do away with inflammable material.

As the deputy state forester of California, Wm. C. Hodge, points out in a communication to the *Timberman* for September, Mr. Hoxie's misunderstanding of the Government timber-sale policy is shown in the *Sunset* article to be almost perfect. Mr. Hoxie says that "The 'practical' invites the *aid* of fire as a *servant*, not as a *mas-*

ter." "One of the conditions inserted in every Government timber-sale contract," replies Mr. Hodge, "is to the effect that the brush, limbs and other débris caused by lumbering operations shall be piled in such a way that it can be burned when the logs have been removed from the area." Mr. Hoxie further says: "Milling operations in practical forestry, would consist of simply a harvest of the ripe and mature timber and cleaning thereafter by the use of the servant fire." "It would be difficult," returns Mr. Hodge, "to summarize the Government policy more accurately"*

With regard to Mr. Hoxie's statement that practical men do not approve of the protective methods employed by the Government, Mr. Hodge writes as follows:

"This is very far from being the case. The most important lumbermen of the state are in complete accord with the Government policy (which is also the policy of this office), and some of them whose holdings are intermingled with those of the Government turn over the matter of fire protection to the Government, simply paying the cost of patrol and fire fighting according to their acreage. Practically all of the big lumbermen have some of their employes appointed state fire wardens. These men have power to arrest for violations of the state fire laws, to summon assistance in fire fighting, and to issue permits to burn dangerous areas under such restrictions as will prevent the escape of the fire."

Frank H. Short, of Fresno, the well-known attorney for power companies in California, and the confessed opponent of Federal control over natural resources, has recently come forward as one representative of the extensive interests which are attacking the specific methods of conservation while commending it in general terms. In a communication addressed to the President of the California Board of Forestry, and printed in the *San Francisco Chronicle* for October 2, Judge Short even goes so far as to recommend, among other things, "intelligent back-firing and other methods of removing inflammable material." Does Judge Short know what back-firing is, or is he simply helping out his allies by borrowing their method of talking at random?

Another active participant in the organized assault is T. B. Walker, of Minneapolis, whose holdings in California embrace some 2,000,000 acres, with a stand of not less than 40,000,000,000 feet valued at $80,000,000, and who is not cutting his timber, but keeping it locked up most effectively. Mr. Walker's holdings are equal to one-half of the total stand of timber owned by the Federal Government in the State of California.

The *San Francisco Chronicle* published on August 17 a further installment of the propaganda devoted to the spread of this advanced doctrine that the way to conserve forests is to protect the standing timber for speculative advances by burning up the young growth, and leave the future of the forest, after the profits have been pocketed, to the care of any agency, public or private, that may like the looks of the investment.

The absurdity and mischievousness of this doctrine apparently did not prevent its gaining the endorsement of Secretary Ballinger, who is quoted in the *Washington Evening Star* of August 25 as having said: "We may find it necessary to revert to the old Indian method of burning over the forests annually at seasonable periods."

If this sort of thing were the alternative of public protection of forests from fire, the life of the forests in private lands would be brief indeed.

But the state forester of California, G. M. Homans, knew very well what was going on, and he was watchful. In the *Sacramento Union* of August 22 he entered prompt and vigorous protest against the theory put forward by these foresters of the counting-house. His communication is as follows:

In one of the San Francisco dailies of August 17, an editorial appeared attacking the practice of patroling and preventing forest fires from raging through the forested lands of the country. The article

*Further details of this policy may be found in the current installment of Mr. Henry Graves' discussion of "The Protection of Forests from Fire."—Ed.

advances the theory that the débris of the forest should be burned at frequent intervals, referring to the example set by the "untutored Indians," as a measure of protection. Another writer expounds the same theory in the August number of *Sunset.*

It seems that these writers have become slightly tangled in the meaning of forestry, and have lost sight of what it is endeavoring to accomplish. They have evidently misconstrued its meaning and aim to be the protection of standing, full grown saw timber *alone.* The term is much broader than this. Those who are practicing forestry are bending their efforts, with marked success, toward the protection of the young, growing trees which are developing into valuable saw timber, as well as the protection of the matured timber from destruction and waste by fire.

If the present stand of matured timber were the only thing to be considered and protected the problem would be an exceptionally easy one, and the theory devised by the above-mentioned writers could be used from a practical standpoint. However, the problem confronting the lumbermen and the foresters of this country is more than the protection of standing mature timber. The problem is to prevent the now standing merchantable timber from destruction until it can be converted into lumber and *also* to prevent *the land* on which these valuable forests are now standing from becoming a barren waste, a sea of brush, after the mature timber has been utilized.

When one stops to realize that a yearling pine or fir tree is no larger than a match and is so tender and sensitive to external conditions that the heat from a fire, even though that fire is no larger than that made by a burning pine needle, will kill it, and when it is considered that a three-year-old tree will be killed by the heat thrown out by three pine needles burning at its base, the advisability of burning over the forest floor takes on a different aspect.

How are we going to burn over the forest areas of the country at frequent intervals and at the same time provide for the development and growth of the new stand of young trees which should take the place of the saw timber which our mills are consuming, thus preventing the land from becoming absolutely worthless?

Through the methods used by the "untutored Indians," and through the carelessness and mismanagement of the old-time lumbermen throughout the United States, there are thousands of acres of land which once produced valuable forests but are now absolutely worthless, producing nothing but brush.

There are other vast areas where only the old mature timber is standing—where successive fires have destroyed all the young growth.

The foresters of the country are now endeavoring to reclaim these barren wastes, through natural and by artificial means, to *young* forests and to assist the young trees to get a start on the areas where only scattered mature timber is now standing.

The only practical method of accomplishing this aim is to keep fire out until after the young forest is past the stage of extreme sensitiveness to heat, at which time the forest policy will, no doubt, be so established that sums of money can be appropriated for the purpose of going through certain sections of forest land, small areas at a time, piling the fallen logs, branches and débris, and burning these piles in a practical, systematic manner at the right season of the year, just as the United States Forest Service is doing to-day in timber sales after the logging operation has been completed.

It is certain that from a business standpoint and from every other point of view, the forest lands should not be left a worthless, fruitless desert after they have been stripped of their present valuable product. What are our mismanaged cut-over lands of to-day producing? What will the lands which now bear only the mature trees produce after they have been logged over? How can we increase the value and productiveness of both these classes of lands? Simply by protecting them from fire.

In two hundred years from now lumber will be just as much in demand, if not more so, by the citizens of this country, as at the present time. There are no new forests to discover and to utilize, and so why should we as the present occupants manage our lands and forests for the selfish aims of to-day alone, when by a little care and with a comparatively slight expense we could leave the country still producing and our forest lands in such shape that our mills can return to these selfsame lands for a second, a third, and innumerable cuts in the future, after we have completed our span? Such a thing is possible, but not through the agency of fire, even as a servant, applied in the manner recommended by a few, because the growing stock and the nucleus of the future stand has not been considered in the protective measures.

EDITORIAL

The Growth of a Great Policy

AMERICAN FORESTRY has from time to time during the last few months reported to its readers the changes made, both by addition and subtraction, in the area of the national forests. These changes, as has been explained, are the result of the careful studies and surveys that began some time ago under Mr. Pinchot and have been carried out to their results since.

Because of the prejudice and misrepresentation that has been so carefully cultivated by some elements in the national forest states it needs to be borne clearly in mind that the boundary changes indicate no change in the national forest policy but carry out what was a part of the plan from the beginning—a rectification of boundaries in accordance with the results of careful surveys, a perfecting of a vast system. Necessarily these extensive and unmapped areas in a wild and mainly mountainous country had to be roughly blocked out in the first instance. Later, as an administrative force was developed, came the opportunity to carefully determine the character of the country and the desirability of including additional forest lands or watersheds, or excluding certain lands not so useful for forestry as for other purposes.

Thus far about half as much land has been added to the national forests as has been taken from them. Many of the plans for the changes were made prior to the change of administration of the Forest Service, and these and additional modifications along the same line have been and are being carried out by the present Forester, Mr. Graves, in full sympathy and accord with the policy of his predecessor, Mr. Pinchot. The areas involved in the changes are considerable, taken by themselves, but very small in comparison to the whole area of the forests. If we were to judge from some of the complaints that have come out of the West and from some of the oratorical efforts of certain western senators and representatives we might suppose that a great amount of fertile agricultural land was being kept from settlement and the prosperity of the West largely hampered thereby.

Frankly, we do not believe this to be the case. If all of the national forests were to-day thrown open to settlement on the most liberal terms, we doubt if many hundred actual settlers would avail themselves of the opportunity. The mountain sides of the Rockies, the Cascades, the Olympics and the Sierras, where the forests chiefly lie, are not of great agricultural value, and the opportunity so offered would be mainly availed of by large operators intent upon gleaning some immediate profit from the national heritage.

Against this the whole principle of est conservation is directed. The idea of a national forest rests upon the greatest good of the greatest number, the right of all the people to share in the common property of all, and the permanent need of forests, especially in mountain regions, as one of the chief foundations of lasting national prosperity. That these principles are sound no unprejudiced student of the world's economic history will deny, no real patriot, no true American, will wish to deny. The development of our national forest system by Hough, Fernow, Roth and Pinchot, under the wise counsel of Secretaries like Noble, Hitchcock, Morton and Wilson, through the administrations of Harrison, Cleveland, McKinley and Roosevelt, has been in the direction of laying these foundations broad and deep. The present ad-

ministration is building, as its successors will continue to do, upon these foundations, and no responsible public official will ever undertake to undo this great and statesmanlike work.

When later history is written there will be found no record of more sagacious administration than this steady upbuilding of the national forest policy.

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The Southern Conservation Congress

THE Southern Conservation Congress at Atlanta was not great in point of numbers or in accomplishment, but as an indication of the general awakening of the country on the great questions that lie at the root of American prosperity it was significant and will sow good seed. It was worth holding for the excellent declaration of principles it produced if for nothing else. In many ways this statement is one of the most clear, well-balanced, and dignified documents that has come from any of these gatherings.

From the opening sentences in which we find emphasis laid on the fact that "such conservation of our natural resources as is consistent with their proper and wise utilization is a deep moral obligation," this declaration abounds in telling phrases and clear-cut definitions. Another statement worth noting, in which we shall find a text for later comment, is the affirmation that "the federal government has the constitutional right amounting to a national duty to acquire lands for forest purposes in the interest of a future timber supply, watershed protection, navigation, power, and the general welfare of the people."

Incidentally in this connection the question may be raised whether this business of holding big congresses is not being somewhat overdone. They have come too closely together in the last few weeks for any one of them to leave a clear impression. They are so frequent that it is becoming difficult to secure the attendance of delegates, for busy men cannot devote themselves wholly to conventions, and a few who are favorably situated to bear the cost in time and money really form the moving force of all of them. They are productive of immense good, but they ought to be spaced a little farther apart and so planned that each could have its full weight and effect.

If the present tendency continues we shall need a central bureau to plan our annual program of congresses, so that conflict may be avoided and a reasonable attendance and effective activity be assured for each one.

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A Recognized Public Need

IN THE Second Conservation Congres at St. Paul there was general recognition of the Southern Appalachain-White Mountain forest bill as the most pressing and immediate conservation measure. It was not looked upon as a question for argument. It was an assumed fact. The same was practically true in the Eighteenth National Irrigation Congress. These two bodies were truly representative of the people of the United States. The second is distinctly western, but it stands for the national spirit and not for the narrow sectionalism voiced by some of the northwestern governors at St. Paul. Some persons like the junior senator from Ohio may still see opportunity for satisfying vanity by holding up this measure, or regard themselves as having a special mandate to be the better judgment of the people against all comers, but the only result will be to increase the ultimate cost of the project, for the intelligence of the country has long ago given its decision in the affirmative and will not be permanently cheated of its will.

The present measure, the Weeks bill, is not perfect. Bills that have been through the fires of legislative strife and the chill of legislative compromise seldom are, but it has many merits from the legislative point of view. It represents the best form of legislation practicable at this time and it should be passed by the Senate without alteration

or amendment. It points the way to a policy that we believe to be good and should be given a full and fair trial. Its errors can be corrected when they have been found by actual test; its good points can be strengthened and developed to the nation's great profit.

The states directly concerned are stirring into action. The co-operation of the United States through the establishment and management of national forests as the center of a system of national, state and private forests throughout the eastern mountains will be of the highest value. The Weeks bill makes this possible. The people of the country ask the Senate not to delay an unnecessary hour in putting this bill upon the statute books.

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The "Ultimate Consumer"

THE *New York Times* recently exhorted its readers editorially to dwell less upon those, ironically called "villains," who develop natural resources for profit, and more upon the consumer and his troubles. "The friends of conservation," it said, "need to think more about the ultimate consumer," and added that "if conservation is ever to be truly popular, it must in some manner operate toward cheapness."

But, if anything is clear, in both history and economics, it is that nothing whatever will "operate toward cheapness" with natural resources, except national retrogression. As long as supplies are abundant, national advance, with increase of population and a rise in the level of efficiency, necessarily means a generally higher standard of living and a larger absolute and per capita demand for commodities; and these, in turn, bring a heavier drain on resources and powers of all sorts. In response to the law of supply and demand, prices rise accordingly. Nor is the tendency reversed by increased production, because production is always costlier than exploitation. With natural resources which cannot be produced, the inevitable outcome is a shortage, while history shows that in prosperous countries even the forests, the chief renewable resource, steadily increase in value under the most conservative and scientific methods of production, as, for example, in Germany. The conclusion is obvious enough. Higher prices for all raw materials are an invariable concomitant of economic and industrial progress. More than that, prices must sooner or later be raised deliberately in order to defray production cost and conservation charges, or else they will be cruelly forced upward by a famine of resources.

In other words, unless the consumer contributes his share toward supplying his necessities by investing in the process of producing and maintaining them, he must consume without producing, at constantly greater expense, and in the long run the store of resources must certainly be devoured. Then the ultimate consumer, ultimate indeed, will pass permanently from the scene with the exhaustion of the resources he has consumed. It is a case of productive and conservative outlay now, or eventually going without.

THE SOUTHERN CONSERVATION CONGRESS

While disappointing in the matter of attendance, and showing the lack of thorough preparation and of concentrated purpose, the Southern Conservation Congress held at Atlanta, October 7 and 8, produced some useful addresses, framed an important statement of principles and policies, and registered the convictions of the South on the fundamentals of conservation.

At the opening session, acting mayor E. E. Pomeroy, of Atlanta, welcomed the congress in the name of the city. Response was made by J. B. White, of Kansas City. The chairman, E. L. Worsham, then briefly stated the object of conservation and of the congress, and thereupon introduced Gifford Pinchot, who dwelt in his address upon the practical workings of the conservation idea where it has been tried, pointing out the need of extending it, particularly in the South, and showing the opportunities for individual service. With reference to the opening for the practice of forestry in the South, Mr. Pinchot said:

The South has to-day the best of chances for the application of practical forestry to her great timber tracts. What the results will be have been amply proven at Biltmore, where magnificent forest preserves have been brought out on some of the poorest lands in the Piedmont region.

The first step to take in the preservation of your forests is to make it easy for the man who wishes to put it into practice on his own lands. Give him something adequate in the shape of fire protection and, if necessary, exempt him from taxation at least to a certain extent. There are thousands of men who would take up the work if encouraged as they might so easily be.

In the second place, every southern citizen should make it his duty to demand of his senator that he vote for the Appalachian and White Mountain preserve bill, which comes up before the United States Senate the middle of next March. Far-sighted southerners have been fighting for this bill for the past twenty years, and they have a better opportunity of having it passed now than ever before. The House has already passed the measure, and with the pressure that the South can bring to bear, it will pass the Senate without the shadow of a doubt.

Addresses by Governor A. E. Willson of Kentucky, B. N. Baker of Baltimore, and H. L. Whitefield of Columbus, Miss., followed. Charles S. Barrett, president of the Farmers' Union, contributed a paper to the proceedings.

At this session E. L. Worsham was elected president of the congress and Dr. N. P. Pratt of Atlanta was elected Secretary.

Conspicuous in the afternoon session of this day was the address by Dr. C. W. Hayes, chief geologist of the United States. Besides giving a number of striking examples of waste in the utilization of Southern mineral resources, Dr. Hayes came out boldly for the view that a full share of the burden of conservation must be borne by the consumer. He insisted that the conservation of natural resources means higher present cost of raw materials and hence of the finished product.

At this session important addresses were delivered also by A. L. Ponder, attorney for, and Henry E. Hardtner, Chairman of the Louisiana state conservation commission, and F. M. Miller, member of the Louisiana legislature, outlining the progressive methods by which Louisiana has recently secured the passage of thirty conservation bills. Other speakers were Dr. A. M. Soule, president of the Georgia Agricultural College, whose subject was "Conservation in Agriculture," and the presiding officer, Charles J. Haden, a member of the executive committee of the Greater Georgia Association.

At the morning session on the second day of the congress, President K. G. Matheson of the Georgia School of Technology presided, and the first address was by J. Girvan Peters, of the U. S. Forest Service, who had for his subject "The Work of the Forest Service in the South." Mr. Peters outlined the history and present status of the lumber and turpentine industries in the South, explained the methods by which the Government co-operates with states and with private timberland owners in working out concrete problems in policy and forest management, indicated the desirable legislation which has been passed by Southern states as a result of information obtained as to their respective needs and opportunities for forestry, and described briefly the principles by which the Government manages the national forests in the South, the Ocala and the Chostawhatchee in Florida. Fnally, he made reference to the proposed establishment of national forests in the Appalachians in these words:

Before concluding I desire to say a few words about the Appalachian bill. I want

to remind you that if this bill becomes a law the sum of $200,000 will be appropriated by the Federal Government to enable the Secretary of Agriculture to co-opertae with the states, when requested to do so, in organizing and maintaining a system of fire protection on private or state forest lands situated upon the watersheds of navigable rivers. The amount expended in any state will not exceed the amount appropriated by that state for the same purpose in the same fiscal year. No agreement will be made, however, with any state that has not provided by law for a system of forest fire protection. In order, therefore, that the Southern states may take advantage of this provision in the proposed law I can not urge too strongly the organization of such protective systems.

The next speaker was Dr. W J McGee, soil-water expert of the U. S. Department of Agriculture, whose subject was the conservation of the soil. Dr. McGee pointed out that the soil products of the south are three times as valuable as the mine products, and contended that whatever threatened the productivity of the soil should not be suffered to go unchecked. "The water supply of the United States," he said, "is only one-half enough to make all our territory productive, as it is, and this shows how imperative is the need to save every drop of this supply." In conclusion, he added:

To this end we must begin immediately the conservation of the forests at the head of our streams. In the state of nature in this section, the streams were clear as crystal, while now they are red with the blood of the land which is being washed away to some day build up an empire in the Gulf of Mexico. Freshets, such as we now have as a result of deforestation are ruinous to both hills and valleys alike and must be checked if we would save our one most valuable asset—our soil.

J. B. White of Kansas City followed with an address on "The Lumberman's Interest in Conservation." The most important point made by Captain White was that lumber is now, and always has been, sold for less than its true value. In discussing this he followed closely the lines taken the day before by Dr. Hayes. He contended that "If forest conservation is ever to be a success, lumber has got to be worth more money than it is now. It must bring what it will cost to produce it. It is our duty to educate the people to this fact, and that if conservation comes the people will have to pay the bill. There is no way of saddling this cost upon the lumbermen. It has got to come fairly upon all classes."

The remaining speakers at the morning session were Mrs. J. K. Ottley; Dr. J. Hyde Pratt, president of the Appalachian Good Roads Association; J. H. Finney, Secretary of the Southern Appalachian Association, and Dr. Thomas D. Coleman of Augusta.

President Worsham presided at the closing session, the first part of which was taken up by the address of Philip Werlein, president of the New Orleans Progressive Union and short speeches by a number of the more prominent persons present. The closing address was by Theodore Roosevelt, who touched upon the need of forest conservation in the South, as follows:

The South has the last hardwood forests of great industrial value on the North American continent. There are coniferous forests placed elsewhere that are not exhausted. I hope the South will use those hardwood forests in such fashion as to get the very utmost business value out of them of which they are capable, provided that the use is always conditioned upon keeping the forests so that our children and children's children shall have their portion of the benefit from them. Cut every big tree that is worth cutting, cut all the timber that can now be used, but cut it in such fashion and use such safeguards that the forests will still remain, that the young trees will remain to grow up in their turn into trees that can be used by your children and your children's children in their turn. Treat each forest as an asset of the country as a whole, as the wise farmer treats his land as, not a merely personal asset for himself, but as an asset for his family.

I hope that Congress will pass the bill for the creation of the great Appalachian forest. Those forests lie in several different states. The waters which rise in them go through more than one state, and it should be peculiarly the work of the national government to see to their preservation. I hope that every one of your representatives in Congress will bestir himself in this matter.

Before adjourning, the Congress adopted the following:

STATEMENT OF PRINCIPLES AND POLICIES

This Southern Conservation Congress in session assembled in the City of Atlanta, State of Georgia, on this 8th day of October, 1910, after full deliberation on matters of vital moment to the people of the South, and through them, to the people of the entire Nation, does hereby adopt and declare the following statement of principles and policies.

We hold firmly and unalterably that such conservation of our natural resources as is consistent with their proper and wise utilization is a deep moral obligation, and that only through recognition and observance of this obligation can the perpetuity of our people be assured.

Pleading for posterity whose rights we hold to be a sacred trust, we enjoin our generation against all needless waste of those abounding resources with which our country is blessed.

Holding it within the legal power of the state as fixed in the Constitution and established by a decision of the Supreme

Court of the United States to protect the common interests of the whole people against individual encroachment, we urge upon our states a fuller realization of their responsibility for guarding the interests and rights of their citizens in the natural sources of prosperity.

Recognizing the running waters of the country as a great natural resource, we hold that they should be administered by the Federal Government and the State Governments within their respective jurisdictions in the interest of all the people; and we urge that the waters be utilized and conserved in accordance with the principle of the greatest good to the greatest number for the longest time.

Viewing purity of water supply as essential to the public and general welfare, we urge upon all municipal, state and federal authorities and upon individuals and corporations requisite action toward purifying and preventing contamination of the waters.

We urge the enactment of the Weeks Bill now pending before the Senate of the United States providing for protective forests, and we affirm that the Federal Government has the constitutional right amounting to a National duty to acquire lands for forest purposes in the interests of a future timber supply, water-shed protection, navigation, power and the general welfare of the people.

Approving the Federal forest policy and the endorsing of service whereby this policy is carried out, we urge upon our states the establishment of state forests and the enactment of laws insuring the conservation of forests in private possession; such laws to provide for more equitable taxation, prevention of forest fires and re-forestation of lands less valuable for other purposes.

We favor co-operative action on the part of states and the Federal Government looking to the preservation and better utilization of the soils by approved scientific methods.

We urge appropriate legislation by the states and Federal Government for the protection of migratory birds, wild game, food fishes and fur-bearing animals.

Appreciating the scenic beauty of our land as a source of patriotism and as a means of promoting the happiness of our people, we urge on communities, municipalities, states and the Federal Government a higher appreciation of this element of public welfare and appropriate action looking towards its maintenance.

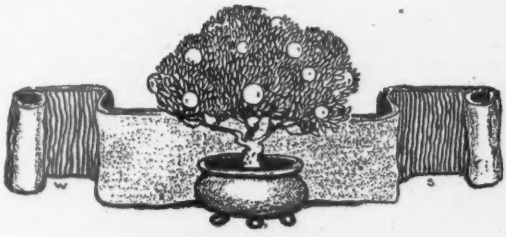
We recommend that the public and private schools instruct the youth of the land in the fundamental doctrines of conservation.

We realize that the fullest enjoyment of our natural resources depends on the life and development of the people physically, intellectually and morally, and in order to promote this purpose we recommend that the training and protection of the people and whatever pertains to their health and general efficiency be encouraged by all methods and legislation suitable to this end. Child Labor should be discouraged and child life protected and developed.

Realizing the appalling waste of human life in mining, transportation and other industrial operations, we recommend legislation increasing the use of proper safeguards for the conservation of lives especially of industrial employees.

Holding that the people of the country have a common interest in the mineral resources, we approve the establishment of a Federal Bureau of Mines to further the conservation of these resources and urge upon our states proper ligislation to the same end, in order that current wastes amounting to an economic crime may be prevented.

Profoundly appreciating the splendid work of state conservation commissions and associations in awakening our people to the Conservation Issue, we urge upon our state legislatures the enactment of laws providing for the maintenance of such commissions with adequate funds for their work; and we call on all Governors of States which have not yet acted to promptly create State Conservation Commissions and clothe them with necessary powers.



EIGHTEENTH IRRIGATION CONGRESS

The Eighteenth Irrigation Congress, held at Pueblo, Colo., September 26 to 30, witnessed a revival of the controversy between Federal and state control of water resources which had given zest to the proceedings of the Second National Conservation Congress. Considerable bitterness of feeling was displayed by the advocates of exclusive state control, and a good deal of time was wasted in declamation and manipulation which might better have been devoted to constructive work. The advocates of Federal control repeated the victory which they achieved at St. Paul. The platform adopted is a strong conservation document.

B. A. Fowler of Phonix, Ariz., was elected president of the congress, and Arthur Hooker of Spokane, Wash., was elected secretary.

Following are the

RESOLUTIONS

This eighteenth convention of the National Irrigation Congress now drawing to a close, made up of duly appointed delegates from all the states west of the one hundredth meridian, and several east of that line, has been notable for the fullness and freedom of discussion concerning every aspect of irrigation. Much of the discussion has reached planes both high and practical and well worthy of preservation in permanent form for guidance in the future. Accordingly, we, the delegates here in session assembled, in the City of Pueblo, State of Colorado, on this 30th day of September, 1910, do hereby adopt the following declaration of principles and affirmation of policies and opinions.

Recognizing the waters of the country as the source of life and the basis of the habitability and productivity of the land, we hold that the waters belong to the people of the country, and that this right of the people in and to the waters is natural, inherent, inalienable and indefeasible.

Recognizing the necessity for administering this invaluable possession of the people by state and federal agencies, we deny the right of state or federal governments, or municipal authorities, to alienate or convey water by granting franchises for the use thereof in perpetuity, or without just compensation in the interest of the people.

Recognizing the interdependence of the various uses of the waters of the country, we hold that the primary uses are for drinking and domestic supply for agriculture through irrigation or otherwise, in which water is consumed, and that the use for navigation and for power, in which water is not consumed, are secondary; and we hold that use of the water should be made with reference to all other uses for the public welfare in accordance with the principle of the greatest good to the greatest number for the longest time.

Accepting the fact that all parts of each drainage area are related and interdependent, we hold that each stream should be viewed and treated as a unit from its source to its mouth; and since the waters are essentially mobile and transitory, we hold that federal control is essential to the equitable distribution and utilization of the waters of interstate streams.

Since the better utilization of our waters for water supply, irrigation, navigation and power requires unification of the various administrative agencies of the Government having charge of the federal regulation nad control of water and waterways into a single agency, we request our representatives in the Federal Congress to take early action looking to the creation of an appropriate agency for this purpose; such agency to be empowered to co-operate with states.

Viewing purity of water supply as essential to the public health and general welfare, we urge on all municipal, state and federal authorities, and on individuals and corporations, constant vigilance and requisite action looking towards purifying and preventing contamination of the waters.

Recognizing the establishment of the United States Reclamation Service, largely through the efforts of this organization, as one of the important steps in the development of this country as a home for a great and growing people, we heartily favor the continuation and extension of the service; and we re-affirm our full confidence in the integrity and capability of the officers of this branch of the public service.

Re-affirming the conviction of the last Congress as to the importance of irrigation by private enterprise, we note with gratification the response by the Federal Congress and the Census Bureau to our demand for complete statistics concerning irrigation, and we commend this subject to the consideration of future sessions of this Congress.

Adhering to the principle of local self-government, we urge co-operation and organization for mutual benefit among irrigators, and advocate provision for irrigation districts by the legislatures of all states in which irrigation is practiced.

Recognizing the economic waste and menace to the public health connected with our vast areas of swamp and overflow lands, we request our representatives in the Federal

Congress to take suitable action looking toward the reclamation of such lands under a policy corresponding with that of the reclamation of arid lands by irrigation under the Reclamation Service; such reclamation of swamp and overflow lands to be carried forward through co-operation between individual owners, States, and the Federal Government.

Viewing adequate and economical transportation facilities as among the great and growing needs of the irrigable region, we approve the development of navigation throughout the rivers and lakes of the United States, in accordance with a comprehensive plan beginning with a deep waterway from the Great Lakes to the Gulf as the main artery of our inland waterway system, and extending to other natural waterways in the order of their magnitude and commercial importance.

Recognizing the close natural connection between forests and stream flow, especially throughout the irrigable region, we heartily commend the Federal Forest policy, and favor its continuance and extension; and we re-affirm our full confidence in the high integrity and exceptional intelligence of the past and present officers of the United States Forest Service.

Approving the progressive withdrawal of lands suitable for homesteads from the national forests, we hold that such withdrawals should be made in the light of expert investigation showing that the agricultural value of such lands is paramount to their value both for forest production and for stream protection.

We reiterate the declaration of the Irrigation Congress of 1907, 1908 and 1909 in favor of establishing national forests in the Southern Appalachian and White Mountains, and direct the attention of our representatives in the Federal Congress to the Bill for this purpose now awaiting final action at the next session of the Sixty-first Congress.

We favor the enactment of laws by the States to regulate the cutting of timber on state and private lands, and laws reforming taxation on timber lands, cut over lands and re-forested lands, to the end that the perpetuity of the forests may be assured and the flow of the streams be preserved.

It is the sense of this Congress that in the federal control essential to the equitable utilization and distribution of interstate streams, recognition must be given to the rights of all citizens who have effected valid rights of appropriation.

We commend the work of the United States Geological Survey, and strongly recommend that more liberal appropriations be made by the Federal Congress and the Legislatures of the States for co-operation in the prosecution of the work of the topographic and water resources branches of this Bureau, including stream measurement.

We commend the irrigation investigations of the officers of the Experiment Stations of the United States Department of Agriculture and of the Agricultural Experiment Stations and State Engineering Departments. and urge more liberal appropriations by the Federal Congress and by the States for the work and co-operation of these agencies and for the more general distribution of the reports and bulletins recording their operations and results.

Holding that the inclusion of public lands in irrigation districts organized under state irrigation district laws, will beneficially extend the operations of such districts and materially aid in the reclamation of arid lands, we recommend to the Congress of the United States the enactment of a law authorizing the inclusion of such lands within such districts, with all the rights, liabilities and exemptions of lands in private ownership, under proper safeguards of the rights of the United States in its public lands.

It is the sense of this Congress that Federal and State Departments in charge of reclamation and conservation work should make accessible to the press the legitimate news of such departments as their work develops, to the end that the people may be informed rapidly and widely as possible on these important subjects.

We recommend that the President of this Congress appoint a commission of five to make a systematic study of the irrigation laws of the various states and to recommend to tht legislatures thereof uniform legislation relating to irrigation.

Since the Dry Farming Congress is working in the interest of scientific soil tillage and conservation of moisture in order to reclaim all possible arid land by saving and utilizing all the available water, this Congress extends hearty wishes for the success of that organization, with the assurance that we appreciate the value of every step that will in any way result in placing a greater area of land under cultivation.

Since the expert knowledge of officers of the Reclamation Service has in the past been invaluable to the Congress at Large, and especially to the Resolutions Committee, we record our regret that this important branch of the public service was not more fully represented at the Eighteenth Congress.

CURRENT LITERATURE

MONTHLY LIST FOR OCT., 1910

(Books and periodicals indexed in the Library of the United States Forest Service).

Forestry As a Whole

Proceedings of associations

Forstverein für das grossherzogtum Hessen. Bericht über die 16. versammlung zu Bad-Nauheim am 16.-19. September, 1908. 102 p. Wimpfen, Germany, C. Elser, 1908.

Forest Education

Forest schools

University of Minnesota—College of forestry. Announcement, 1910-1911. 50 p. Minneapolis, Minn., 1910.

University of Nebraska-Forest club. Program, 1st semester, 1910-1911. 4 p. Lincoln, Nebr., 1910.

Forest Legislation

West Virginia—Legislature. West Virginia forest, game and fish laws, and the Lacy bird law. 62 p. [Charleston, W. Va.], State printers, 1909.

Forest Description

Holmes, J. S., and Foster, J. H. A study of forest conditions of southwestern Mississippi. 56 p. map. Jackson, Miss., 1909. (Mississippi—Geological survey. Bulletin 5).

Lewin, D. The eucalypti hardwood timbers of Tasmania, and the Tasmanian ornamental and softwood timbers. 140 p. illus. Hobart, Tasmania, Gray Brothers, 1906.

Forestry Botany

Trees: classification and description

Elwes, H. J., and Henry A. The trees of Great Britain and Ireland, vol. 5. 333 p. plates. Edinburgh, Scotland, Privately printed, 1910.

Schaffner, John H. Trees of Ohio and surrounding territory. 119 p. Columbus, Ohio, 1909. (Ohio state academy of science. Proceedings, vol. 5, pt. 3. Special paper, no. 15).

Woods: classification and structure

Hough, Romeyn B. American woods, exhibited by actual specimens and with copious explanatory text. pt. 11. 25 sections. Lowville, N. Y., The author, 1910.

Silvics

Forest influences

Whipple, James S. The forests. 12 p. N. Y., Editorial Review Co., 1910

Ecology

Wallenböck, R. Bodenphysikalische untersuchungen in mischbeständen von eiche und buche. 8 p. Wien, W. Frick, 1910.

Studies of species

Schiffel, A. Beitrag zur begründung der lehre über die erziehung der fichte. 21 p. illus. Wien, W. Frick, 1910.

Silviculture

Schlich, Wm. Manual of forestry, vol. 2: Silviculture. 4th edition. 424 p. illus. London, Bradbury, Agnew & Co., 1910.

Planting

Plummer, F. G. The growing of eucalypts. 28 p. New Haven, Conn., Yale publishing association, 1910.

Zederbauer, E. Versuche über aufbewahrung von waldsämereien. 8 p. Wien, W. Frick, 1910.

Forest Protection

Diseases

Great Britain—Agriculture and fisheries, Board of Leaf-shedding in coinfers, due to Botrytis cinerea. 3. p. illus. London, Eng., 1910. (Leaflet no. 234).

Fire

California—Forestry, State board of. A handbook of forest protection; forest laws, rules for the prevention of fires, instructions to fire fighters, list of firewardens, 1910. 34 p. Sacramento, Cal., 1910.

Smokes and vapors

Rušnov, Peter v. Über die feststellung von rauchschäden im nadelwald. 13 p. Wien, W. Frick, 1910.

Forest Administration

Bavaria—K. staatsministerium der finanzen—Ministerial-forstabteilung. Mitteilungen aus der staatsforstverwaltung Bayerns, 10. heft. 157 p. plates. München, 1910.

India—Burma—Forest department. Report on forest administration for the year 1907-08. 206 p. Rangoon, India, Supt. government printing, 1909.

India—Central Provinces—Forest department. Report on forest administration for the year 1908-09. 155 p. Nagpur, India, Government press, 1909.

National and state forests

Ammons, E. M. Forest reservations; address delivered before the joint session of the Colorado legislature, March, 1909, relative to the rights in and uses of forest reservations. 18 p. Wash., 1910. (U. S. 61st congress; 2d session. Senate document 650).

Forest Utilization

Pierson, Albert H. Consumption of firewood in the United States. 7 p. Wash., D. C., 1910. (U. S. Agriculture, dept. of Forest service. Circular 181).

Wood preservation

Berlin mills co. The selection of structural wood and its preservation from decay. 25 p., illus. Portland, Me., 1910.

Auxiliary Subjects

Conservation of natural resources

Finley, W. W. Address before the 2d National Conservation Congress, St. Paul, Minn., Sept. 7, 1910. 8 p. St. Paul, Minn., 1910.

Periodical Articles

General

Atlantic monthly, September, 1910.—Economics of waste and conservation, by J. B. Clark, p. 325-31.

Blackwood's Edinburgh magazine, August, 1910.—Old English forestry, by J. Nesbit, p. 181-9.

Country gentlemen, July 21, 1910.—The miracle tree; eucalyptus craze in California, by J. T. Bramhall, p. 684-5.

Garden magazine, October, 1910.—An experience in transplanting a tree, by F. H. Moore, p. 148.

Gardener's chronicle, August 13, 1910.—The natural history of Coniferæ, by P. Groom, p. 115-16.

Gardener's chronicle, August 20, 1910.—The royal school of forestry at Eberswalde, bq G. W., p. 134-5.

Gardener's chronicle, September 10, 1910.—Mortality of transplanted Coinferæ, by J. Clark, p. 203.

Munsey's magazine, October, 1910.—The forest ranger at work, by R. R. Howard, p. 53-63.

Pennsylvania-German, Sept., 1910—Pennsylvania German plant names, by C. D. Mell.

Pennsylvania-German, October, 1910.—The use of willow rods by the ancient Germans, by C. D. Mell.

Philippine agricultural review, Aug., 1910.—The Philippine school of forestry; a new profession for Filipinos, p. 480-1.

Philippine journal of science, series A, May, 1910.—The study of Manila copal, by P. C. Freer, p. 171-2; The almaciga tree, Agathis alba, by F. W. Foxworthy, p. 173-5; Manila copal, by G. F. Richmond, p. 177-201; The destructive distillation of Manila copal, by B. T. Brooks, p. 203-7; The oxidation of Manila copal by the air, by B. T. Brooks, p. 219-27; The oleoresins of Pinus insularis, by B. T. Brooks, p. 229-31.

Popular science monthly, Oct., 1910.—Address before the National conservation congress, by W. H. Taft, 313-32; The role of hybridization in plant breeding, by E. M. East, p. 342-55.

Scientific American supplement, Aug. 27, 1910.—Preservative treatment of farm timbers, by C. P. Willis, 140-1.

Sunset magazine, Oct., 1910.—Sheep without a shepherd, by Wm. C. Barnes, p. 452-5.

Technical world magazine, Oct., 1910.—Policing the national forests, by Henry M. Hyde, p. 157-65.

Twentieth century magazine, Sept., 1910.—A brief history of the conservation movement; conclusion, by M. F. Abbott, p. 511-15.

Trade journals and consular reports

American lumberman, Oct. 1, 1910.—Forestry observations in Europe, by F. Roth, p. 42C.

Hardwood record, Sept. 25, 1910.—Life at Biltmore, a school of technical lumbering, p. 28-30.

Hardwood record, Oct. 10, 1910.—Compound wagon axles, p. 44-5.

Lumber review, Sept. 15, 1910.—Hard woods and hardwood flooring in Hamburg, by R. P. Skinner, p. 16.

Lumberman's review, Sept., 1910.—Wood preservation; kyanizing applied to spruce greatly prolongs its life and wear, p. 17.

Pacific lumber trade journal, Sept., 1910.—Treated wood block paving is the recognized standard, by G. Winslow, p. 49.

Paper mill, Aug. 27, 1910.—Russia's forests; their extent as reported by the American consul-general at Moscow, p. 40.

Paper mill, Sept. 24, 1910.—Paper fibres, by C. R. Dodge, p. 12, 34, 36.

Paper trade journal, Aug. 25, 1910.—Sweden's growing wood pulp trade, p. 4.

Paper trade journal, Sept. 15, 1910.—New way of making wood pulp, p. 36, 42; Encouraging conservation; report presented by the delegate of the American paper and pulp association to the National conservation congress at St. Paul, Minn., by E. W. Backus, p. 48.

Pioneer western lumberman, Oct. 1, 1910.—Timber in the inland empire, by C. H. Shattuck, p. 27.

Railway journal, Oct., 1910.—Treated timber for railroad ties, by J. L. Single, p. 7.

St. Louis limberman, Sept., 1, 1910.—Tabasco mahogany, by T. F. Lee, p. 69-71; Increasing popularity of wood paved streets, p. 76.

St. Louis lumberman, Oct. 1, 1910.—Chicago and creosoted wood block paving, p. 72.

Southern lumberman, Sept. 10, 1910.—New process; company in North Carolina to extract turpentine and rosin from lightwood, p. 34.

Timberman, Sept., 1910.—Practical utilization of dynamite in fighting forest fires of northwest, by F. C. Young, and others, p. 32M; Tongass national forest of southeastern Alaska has 15,490.086 acres, by W. A. Langille, p. 27; Forestry and the fire problem of northwest, by A. H. Hodgson, p. 45; How to obtain the highest practical efficiency in woods operation, by J. P. Van Orsdel, p. 48 51.

United States daily consular report, Sept. 16, 1910.—Wood alcohol in Germany, by F. W. Cauldwell, p. 832.

United States daily consular report, Sept. 29, 1910.—Wood-working machinery in Russia, by J. H. Snodgrass, p. 961-4.

United States daily consular report, Sept. 30, 1910.—Prevention of forest fires in Saxony, by C. B. Hurst, p. 986-7.

United States daily consular report, Oct. 7, 1910.—Wood-block paving in Europe, by A. M. Thackara, p. 81-2.

United States daily consular report, Oct. 11, 1910.—Lumber and tie industry of Hokkaido, by T. Sammons, p. 134-5.

United States daily consular report, Oct. 13, 1910.—Shoe-last industry in England, by S. S. Partridge, p. 169.

United States daily consular report, Oct. 14, 1910.—Wood and lumber trade; British Columbia, England, Spain, by G. N. West and others, p. 177-80; Woods and forests; Sweden, United Kingdom, by E. D. Winslow and others, p. 180-1.

Woodworker, Sept., 1910.—Circassian walnut; where it grows, by W. Widdicomb, p. 43-4; Preparation of core stock and cross banding, p. 47-8.

Forest journals

Allegemeine forst- und jadg-zeitung, Aug., 1910.—Studien und wahrnehmungen über das entstehen neuer, praktisch wichtiger formen von pflanzen auf dem gebiete der land- und forstwirtschraft, by O. V. Anderlind, p. 273-9; Aus dem forstlichen versuchswesen, by Heck, p. 279-93.

Allegemeine frost- und jadg-zietung, Sept., 1910.—Ertragstafeln für kiefern im lichtungsbetrieb, by Wimmenauer, p. 321-33.

American forestry, Oct., 1910.—The second conservation congress, by E. A. Start, p. 569-88, 597-600; The forest and the nation, by H. S. Graves, p. 607-10.

Centralblatt für das gesamte frostwesen, Aug.-Sept. 1910.—Einiges über den urwald von waldbaulichen gesichtspunkten, by L. Cermak, p. 340-70; Die jährlichen temperaturextreme auf den hohen warte zu Wien im Wienerwalde in den 25 jahren 1879 bis 1903, by R. Wallenböck, p. 370-6.

Forest leaves, Oct., 1910.—Influence of forests upon the climate of the surrounding country, by C. L. Kirk, p. 164-6; Reforesting our denuded white pine and hemlock lands, by W. F. Dague, p. 166-8; Prostrate juniper, by A. C. Treichler, p. 168; The forest nursery, by W. H. Kraft, p. 168-9; The important timber trees of Pennsylvania, and where they should be planted, by P. H. Mulford, p. 170-74.

Minnesota forester, Sept., 1910.—What a forest fire really is, p. 85-7; What they are doing in the West, p. 87-90.

Oesterreichische vierteljahresschrift, 1910.—Ueber umtriebszeit und hiebssatzermittlung, by A. Schiffel and A. von Gutfenberg, p. 1-28; Betrachtungen zur bodenwertformel, by A. von Guttenberg, p. 28-36; Ueber die methoden der forstlichen rentabilitätsrechnung, by A. Hofmann, p. 198-217; Die buchene eisenbahnschwelle, by D. Schneidt, p. 157-83; Die verbauung des Lamm- und Schwandenbaches bei Brienz in der Schweiz, by A. Blaschek, p. 183-98.

Revue des eaux et forêts, Sept. 1, 1910.—Sur le pin d'Auvergne, by A. d'Alverny, p. 513-25; Les forêts de la baronnie de Lafauche, by M. Rothéa, p. 526-31.

Revue des eaux et forêts, Sept. 16, 1910.—Le débardage des longs bois en montagne au moyen de cables de retenue, by P. Bauby, p. 545-54.

Schweizerische zeitschrift für forstwesen, Aug., 1910.—Ueber die künstliche veranlassung des abganges von lawinen, by F. W. Sprecher, p. 236-42.

Zeitschrift fur forst- und jadgwesen, Sept., 1910.—Zur klassifikation der waldböden, p. 568-72; Der hausschwamm in der natur, by K. Havelik, p. 573-7.

WHAT FOREST FIRES COST IN 1910

WHILE an accurate estimate of the total fire damage of the past season will never be made, enough is known to place the damage to standing timber in round figures at from $175,000,000 to $200,000,000.

The timber consumed, or damaged beyond hope of utilization before it becomes a total loss by decay, was roughly equivalent to the entire lumber cut of two years, assuming 40,000,000,000 feet as the average annual cut.

Since not more than one-third as much timber is grown as it takes to meet the yearly demand, it would take six years' growth of all the forests of the country to replace the supply wiped out by this year's fires.

The cost of fighting these fires was not less than $1,500,000, and probably exceeded this sum.

Since the production of every thousand feet of lumber represents $10 in wages, $8,000,000 was lost to industry in wages. This is equally true whether or not an equivalent amount is spent for labor in salvage or in converting other forests into manufactured products; for in the long run, the reduction of the forest stock below the minimum required to meet the current demand means the depression of the lumber industry, curtailment of the cut, and consequently a diminished outlay for labor, with corresponding loss in wages.

Before the severe fires of August were more than a probability, this magazine placed the loss to property from the fires in the United States and Canada at about $100,000,000. Since then the fires of the Northwest have caused losses of probably not less than $25,000,000 in the national forests, and those of the Northwest and the Lake States together have destroyed not less than $50,000,000 worth of timber owned by states and private persons.

Details are most complete for the losses to Government timber, and it is probable that state and private owners of timber suffered more nearly three times than twice as heavily as the Nation by these fires.

A comparison of the public losses with the private losses for the whole country indicates that the private losses were seven times greater than the public losses, in spite of the fact that privately owned forests are not more than five times greater in extent and are more accessible than those publicly owned.

To replace forests by planting on the 4,000,000 acres burned over would cost not less than $40,000,000. It is likely however that over much of the area natural seeding from live trees left standing will furnish the beginnings of new growth.

No attempt has been made by AMERICAN FORESTRY to estimate the damage to young growth or to the soil. For much of the burned-over land this damage would increase the estimated losses two or three fold.

STATE WORK

New York

Commissioner Whipple Resigns

The commissioners appointed by Governor Hughes to investigate the Forest, Fish and Game Commission of New York have made their report. While recognizing the value of much of the work done by Commissioner Whipple, they criticize severely some of the methods of the office, particularly of the legal department. As a result of this, Commissioner Whipple submitted his resignation to the Governor. This, and the reply of the Governor, follow:

It is unfortunate that any questions of this kind have arisen in connection with the forestry work of New York, which has been so creditable in many respects. Mr. Whipple's service has been valuable not only in his own state but through the example which he has furnished for the forest work of other states.

October 3, 1910.

Hon. CHARLES E. HUGHES, *Governor*,
Executive Chamber,
Albany, N. Y.

My dear Governor:

I have read the report of the Commission appointed by you to investigate the administration of the Forest, Fish and Game Department. As a result of the criticisms made of my department, I desire to tender my resignation to take effect at once.

This is not the time to discuss either the facts or the conclusions set up in the report, but I do emphatically deny the truth of the facts stated and disagree from the conclusions reached. I recognize, however, that, as a result of this report, my usefulness to the State in this department has been destroyed.

I have held this position for six years. I was not an applicant for the position. I have come to appreciate the great importance of the work of this Department to the people of the State. I have heard New York State cited as an example in the conservation of its forests in many states of the Union. The work of my Department has increased many fold during my administration. It extends to all parts of the State. The work of this Department has extended along new lines,—some of it experimental. The field covered is so large that much of it must be intrusted to subordinates. That a critical examination covering the six years of my administration would disclose errors of judgment and mistakes made should be expected. I think a similar examination would show errors and mistakes in the management of any great business organization of the country. I will not attempt to offset these with the good that has been accomplished during the same time. I will only say that my conscience acquits me on any intentional neglect or dereliction of duty. I have given to the work my entire time and my heart has been in it. I have kept in touch with the friends of conservation in the State. It is a thousand times more important that this great work should go on and that it should not become a subject of political contention than that I should retain the office.

For these reasons, to relieve you of any embarrassment, and without solicitation on the part of anyone, I respectfully tender my resignation.

Very truly yours,
(Signed) J. S. WHIPPLE.

State of New York
Executive Chamber, Albany
October 3, 1910.

Hon. JAMES S. WHIPPLE,
Albany, N. Y.

Dear Sir:

Your letter of this date resigning your office as Forest, Fish and Game Commissioner has been received. It is imposible for me adequately to express the regret that I feel at the conditions which the investigation of your department has shown to exist.

Your work has been strongly commended to me by those who are interested in the protection of the forests and in the conservation of the State's interest in those important resources. You should have full credit with respect to those matters in which there has been increased efficiency; and I desire to believe, and I accept your statement, that you have not been guilty of wrong intention.

But the conditions which have been shown to exist cannot be ignored and must be immediately rectified.

Your resignation is accepted and under the statute took effect when it was received and filed in this office.

Very truly yours,
(Signed) CHARLES E. HUGHES.

NEWS AND NOTES

Indiana Forestry Association Formed

The Indiana Forestry Association is the name adopted for the new organization which is being promoted in Indiana by Charles W. Fairbanks and others to assist in the work of protecting trees and planting new trees in the waste places of the state.

The following will be the twelve directors and incorporators: Thomas R. Marshall, Governor of Indiana; Charles W. Fairbanks, former vice-president of the United States; Addison C. Harris, attorney, Indianapolis; William Lowe Bryan, president of Indiana University; Dr. John N. Hurty, secretary of the state board of health; Winthrop E. Stone, president of Purdue university; John B. Connor, editor of the Indiana Farmer; Mason B. Thomas, of Wabash College; Edgar A. Perkins, the newly elected president of the Indiana State Federation of Labor; George B. Lockwood, of Marion; Hugh J. McGowan, president of the Indianapolis Traction and Terminal Company; and Oscar Hadley, state treasurer.

Needed Forest Laws for Washington

The Washington commission on forest legislation, appointed by Lieutenant Governor Hay, has recommended to the executive and to the legislature the enactment of a law creating a state forestry department; another law providing state means for the reclamation of logged off lands on the ten-year bond issue improvement plan; a law providing for the submission of a constitutional amendment providing for reforestration of non-agricultural logged off lands, with exemption from taxation for a stated period, and, finally, a law enlarging the scope of the forestry department in the protection of the forests of the state from destruction by fire.

The Proposed Nebraska State Forest

A member of the Forest service has, at the request of the Nebraska Conservation Commission examined the tract of wooded land between Bellevue and South Omaha, Nebraska, which the commission desires to have the state purchase for forest purposes. In his report the forester favors the proposed plan. It is expected that the land would cost between $100,000 and $150,000.

$5,000,000 from a Town Forest

A remarkable example of modern forestry is furnished by the little town of Orson in Sweden. The town, says the *Lumbermen's Review*, is probably the only municipality in the world which has ordinary city expenses, but which imposes no taxes upon its citizens. Moreover, the local railway is free to every citizen, and there is no charge for telephone service, schools, libraries and the like. This happy state of affairs is due to the wisdom of a former generation of citizens and rulers of Orson, who planted trees on all available ground. During the last thirty years the town authorities have sold no less than $5,000,000 worth of young trees and timber, and judicious replantings have provided for a similar income in the future.

Biltmore Winter Term

The members of the Biltmore Forest School sailed October 4 for Germany, where they will make their winter quarters at Darmstadt.

China May Send Us Students of Forestry

A dispatch to the New York Herald from Pekin says that Major Ahearn, chief of the Philippine Bureau of Forestry, who is now touring in China, conferred with a number of government and provincial officials recently concerning the needs of China for afforestation. The interest which he aroused indicated that in all probability a number of students will soon be sent to American forest schools.

Resolutions of Minnesota Citizens

A mass meeting of citizens at Hibbing, Minn., adopted on October 14 the following resolutions on the forest fire situation:

"Whereas, the timbered portions of the state of Minnesota have at intervals for the past several years been visited by disastrous forest fires, the most extensive being the fire in 1893, which destroyed the village of Hinckley and devastated the surrounding country, resulting in the loss of 416 human lives and property of untold value; the fire which destroyed the village of Virginia, in this county, in the same year, resulting in a great loss of property, but fortunately no loss of life; the fire which destroyed the village of Chisholm in this county in 1908,

and laid waste a territory that was almost an empire in extent, entailing a property loss of several millions of dollars; and the recent deplorable fires in the northern counties of the state, which have resulted in the loss of so many lives and property of almost stupendous value and left a multitude of people homeless and penniless, all of which occurred directly at a result of forest fires, not mentioning the numerous small fires which were not sufficiently disastrous to attract public attention, and

"Whereas, said fires have almost without exception originated upon cut-over lands, from which the timber had been removed six or seven years previously thereto, and such fires destroyed not only the farm buildings of the thrifty homesteader and the homes of the artisan and toiler, which represented a life-time of honest toil, and also destroyed marketable timber, the value of which was so great that it cannot even be estimated, but in addition thereto they destroyed the young growing timber, which in a few years would be of sufficient size to be marketable, and which should have been conserved for future generations as their legitimate heritage, and

"Whereas, we believe that the recurrence of such fires may be prevented and the danger to life and property therefrom be almost wholly removed, and

"Whereas, the state of Minnesota in the largest single owner of timber holdings within its borders and has through such fires lost property of such value that the actual cost of an intelligent and effective system for the prevention of such fires appears infinitesimal in comparison therewith, and

"Whereas, in the Scandinavian peninsula, Germany and numerous other foreign countries, systems are in vogue and working admirably for the prevention of such fires, and we have enough confidence and pride in the people of our own state to believe that what foreign nations have done successfully we can do successfully, in view of the foregoing.

"Be it resolved, that we urgently request the legislative and executive departments of the state to take such steps at their earliest convenience as will, so far as possible, prevent the further needless loss of life and property from that source in the timbered portions of our state, and to that end we humbly suggest that a sufficient and effective patrol system be inaugurated by the state, say of one patrolman to every six square miles of territory, whose duty it shall be to, as far as possible, prevent forest fires and to discover and extinguish them at their outset, without waiting until they have developed into a raging conflagration."

American Shippers Criticized

In an editorial entitled "American Methods," the *Timber News*, of London, England, has stirred up something of a hornets' nest among the lumber journals of the United States. The burden of the article is the statement that "British timber agents and importers have on many occasions good cause to declare that they have been swindled out of their money by certain lumber shippers in various American ports, timber often being sent (and for which shippers have drawn the money before it has been received on this side) which on arrival has turned out to be of a very low grade, and far from what the shipper, according to his contract, ought to have supplied." An instance is quoted of a Hamburg firm which has taken civil and criminal proceedings against two New Orleans lumber companies, and already been awarded £5,000 damages in the civil case. It looks as though the *Timber News* had been a little hasty in taking up arms, but from the result of this particular case, and from the haste and energy with which several of the United States journals have criticized the London journal for its article, it would also appear that the shoe pinches in spots. Whatever the facts may be, the result will be beneficial, as too much publicity cannot be given to the few unscrupulous members of the trade whose methods may have far-reaching evil effects. The fact that the defendants in the civil suit had to pay $25,000 for the liberties they took with their customers in Hamburg, is a strong indication that the laws and customs of the United States, if rigidly enforced, are quite sufficient to protect foreign purchasers.—*Exchange.*

Idaho Understands Conservation

The Potlatch Lumber Company recently applied to the state of Idaho to purchase outright 24,000 acres of state lands, on which the company already owns the timber under a twenty-year contract. Their application has been approved by the state.

The attitude of the state of Idaho is to be commended for the position it has taken on this question. From every standpoint, their reasoning is sound. To compel the Potlatch Lumber Company to strip the timber from the land, irrespective of market conditions, would have been simply preposterous and invited criminal waste. The lumber company had prepared itself to denude the land within the time specified in its twenty-year contract with the state, so it was fortified to meet its obligations. Slowly the idea is gaining ground that true conservation means the most complete utilization of any product. For every foot of lumber cut a profit should be realized to help develop other industries after the timber is denuded. To merely slaughter the timber, irrespective of the needs of trade, is essentially wrong. Lumbermen everywhere were deeply interested in the outcome of this question, as it means the market will not be glutted and gorged with a tre-

mendous output, which would weaken and disturb trade generally, without accomplishing any good to any one, and least of all to the state of Idaho.—*Timberman.*

* * *

Farm Forests of Virginia

One of the results of a recent study of forest conditions in Virginia, made by the state in cooperation with the Forest Service is the publication of a report on "The Farm Forests of Virginia," by W. W. Ashe, of the Forest Service. This report is printed by the state of Virginia.

After reviewing the general forest situation in Virginia, and showing that the state must ultimately face the problem of producing wood for home consumption, since her neighbors are not prepared to raise surplus timber, Mr. Ashe takes up the possibilities offered in the state for successful woodlot management on the farms. In many respects, he points out, the farmer is in a better position to make his forests profitable than is the owner of large tracts. "Low-grade timber in many sections has only a nominal value, on account of the lack of extensive nearby markets. In this respect, the farmer is advantageously situated, since he has a constant though limited demand on his farm for low-grade wood for fuel and for ordinary buildings, and can save his best timber for the market.

"Forest fires endanger young growth, and fire protection is costly to the individual and difficult to put into effect. In the case of the farm forests, most of the forest land is isolated in bodies separated by fields, and this danger is much reduced. In the western counties, however, where the forest lands of many owners who have their farms in the valleys lie together on the mountains, protection from fire becomes the most important problem, on account of the great difficulty of preventing and extinguishing the fires and the enormous damage done by them to young timber. This difficulty can be met by cooperation among landowners to secure wardens and patrols, and by obtaining more effective forest fire legislation.

* * * * *

"While the farmer cannot become a forester, he can acquire the general principles of managing timberlands. On account of his own need for fuel and for low-grade timber, and in addition frequently a nearby town market as well, he can use the tops of trees and small and defective trees. He can increase the yield and improve the quality of timber in a stand by thinnings; he can carry on improvement cuttings to remove dead, defective, and low-grade trees; he can cut so as to determine or affect the character of the young growth; he can plant small openings with seedlings of desirable species."

The report then describes the character of the three types of forests that are found in the Tidewater region, the Piedmont region, and the Mountain region, respectively, and takes up the ways and means of increasing the value of the farm forests.

"The most important problem in connection with the conservation of the present farm forests and the maintenance of an abundant and cheap supply of timber for future domestic use are:

"1. Protection of the forests, especially of the second growth, from fire.

"2. Development and maintenance of farm forests.

"3. The use of idle and waste lands by forest planting.

"4. Education in forestry for farmers."

STATE FORESTRY ORGANIZATIONS

A list of state forestry associations and their secretaries is printed below. Corrections in this list will be carefully recorded by AMERICAN FORESTRY.

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Appalachian Mountain Club	R. B. Lawrence	Tremont Bldg., Boston.
Arizona—Salt River Valley Water Users' Association.	Charles A. van der Veer	Phoenix.
California—Water and Forest Association	I. C. Friedlander	1405 The Merchants Exchange Bldg., San Francisco.
Forestry Educational Association	E. C. Damon	San Diego.
Sierra Club	William E. Colby	San Francisco.
Pacific Coast Forest, Fish and Game Association.	Wm. Greer Harrison	San Francisco.
Tri-counties Reforestation Committee	Miss L. A. Finch	Riverside.
Colorado Forestry Association	Ellsworth Bethel	Denver.
Connecticut Forestry Association	F. H. Stadtmüller	Elmwood.
Georgia Forestry Association	Alfred Akerman	Athens.
Indiana Forestry Association		(organization not yet complete).
Iowa Park and Forestry Association	Welsey Greene	Des Moines.
Louisiana Forestry Association	Mrs. A. B. Avery	Augusta, 254 Stoner Avenue, Sheveport.
Maine Forestry Association	Edgar E. Ring	Augusta.
Massachusetts Forestry Association	Irving T. Guild	4 Joy St., Boston.
Michigan Forest Association	H. G. Stevens	25 Band Chambers, Detroit.
Minnesota State Forest Association	E. G. Cheyney	St. Anthony Park.
Nebraska Park and Forestry Association	Miss Leila B. Craig	York.
New England Forest, Fish and Game Association.	Arthur T. Harris	16 State St., Boston.
New Hampshire—Society for the Protection of New Hampshire Forests.	Allen Hollis	Concord, N. H.
New York—American Forest Preservation Society.	Geo. Milroy Bailey	Corfu, N. Y.
Forestry, Water Storage and Manufacturing Association of the State of New York.	Chester W. Lyman	1 Broadway, New York.
Northern New York Forestry Association	O. B. Trappan, Director	Potsdam, N. Y.
State of New York Fish, Game and Forest League.	L. C. Andrews	Elmira.
The Association for the Protection of the Adirondacks.	Edward Hagaman Hall	Tribune Bldg., New York City.
North Dakota State Sylvaton Society	Miss Ella J. Mitchell	Penn.
Ohio—Cincinnati Forest and Improvement Association.	Adolph Leue	127 West Twelfth St., Cincinnati.
Ohio State Forestry Society	Prof. J. J. Crumley	Wooster.
Oregon Conservation Association	A. B. Wastell	904 Lewis Bldg., Portland.
Pennsylvania—Franklin Forestry Society	W. G. Bowers	Chambersburg.
Pennsylvania Forest Association	F. L. Bitler	1012 Walnut St., Philadelphia.
Vermont Forestry Association	Ernest Hitchcock	Pittsford.
Washington Conservation Association	Clarence H. Bailey	P. O. Box 236, Seattle.
West Virginia Forestry Association	A. W. Nolan	Morgantown.

An Important Notice

TO MEMBERS OF THE AMERICAN FORESTRY ASSOCIATION

Members of the American Forestry Association have been informed through this magazine of the new arrangement by which membership in the Association does not include the magazine as heretofore. The dues for annual membership were accordingly made one dollar instead of two dollars at the last annual meeting, the subscription to the magazine being two dollars. This arrangement was made necessary by a ruling of the Post-office Department in regard to rights of entry for AMERICAN FORESTRY as second-class mail matter. The new arrangement has been in operation during the year 1910 as regards new members, but did not affect those who had already received their bills for 1910 under the old plan. There are these options under the new plan. Membership with or without subscription to AMERICAN FORESTRY, or subscription to AMERICAN FORESTRY with or without membership in the Association.

We earnestly hope all of our members will retain both membership and subscription. The former will maintain their connection with a great movement which is constantly gaining in importance. The latter will give them their money's worth. AMERICAN FORESTRY has entered upon the most useful period of its career. Its work is well defined, its position is generally recognized, and it commands the best work of the authorities on forestry. It occupies its field alone and it is one of the magazines of authority that the man or woman who wishes to be well informed on public questions cannot afford not to read.

IMPORTANT BOOKS ON FORESTRY

PRINCIPLES AND PRACTICE OF FORESTRY

FOREST MENSURATION. By HENRY SOLON GRAVES, M.A. A complete text book of this important subject and the first written for American Foresters. It deals with the determination of the volume of log, tree, or stand, and with the study of increments and yields. *Price, $4.00*

ECONOMICS OF FORESTRY, THE. By B. E. FERNOW. This volume treats of forests and forestry from the standpoint of political economy, and is designed to furnish a trustworthy basis for formulating public policy. *Price, $1.50*

FIRST BOOK OF FORESTRY, A. By FILIBERT ROTH. An outline of the general principles of forestry, written in simple, non-technical language, designed particularly for the beginner. *Price, 90c*

PRACTICAL FORESTRY, FOR BEGINNERS IN FORESTRY, AGRICULTURAL STUDENTS, AND WOODLAND OWNERS. By JOHN GIFFORD. A good general description of the principles of forestry with enough technical information to prepare the beginner. *Price, $1.20*

HISTORY OF THE LUMBER INDUSTRY OF AMERICA. By J. E. DEFEBAUGH. The first authoritative work of its kind yet issued, and one which will commend itself alike to the timber owner, lumberman, lumber manufacturer, or merchant, or student of economics. In four volumes bound in half leather. *$5.00 per volume*

FOREST PLANTING. By H. NICHOLAS JARCHOW. An illustrated treatise on methods and means of restoring denuded woodland. *Price, $1.50*

HEDGES, WINDBREAKS, SHELTERS, AND LIVE FENCES. By E. P. POWELL. A treatise on the planting, growth and management of hedges with information concerning windbreaks and shelters. *Price, 50c*

NORTH AMERICAN FORESTS AND FORESTRY. By ERNEST BRUNCKEN. This volume, expository in its character, is written in a style intended for the general reader, to whom it should convey a good idea of our forests forestry. *Price, $2.00*

PRACTICAL FORESTRY. By ANDREW S. FULLER. A treatise on the propagation, planting and cultivation, with descriptions and the botanical and popular names of all the indigenous trees of the United States, and notes on a large number of the most valuable exotic species. *Price, $1.50*

PRINCIPLES OF AMERICAN FORESTRY. By SAMUEL B. GREEN. Prepared especially for students in elementary forestry and for the general reader who wishes to secure a general idea of forestry in North America. *Price, $1.50*

SEASIDE PLANTING OF TREES AND SHRUBS. By ALFRED GAUT. Illustrated from photographs by FRANK SUTCLIFFE. This is a new volume in the English Country Life Library. Advice regarding selection and management to get satisfactory effects under adverse influence of closeness to seashore. *Price, $1.75*

FOREST MANAGEMENT. By C. A. SCHENCK. Describes methods here and abroad to bring the most profit from all investments made in woodlands. *Price, 75c*

FOREST MENSURATION. By C. A. SCHENCK. Treats conditions in U. S. from mathematical and practical standpoint. *Price, $1.25*

FOREST FINANCE. By C. A. SCHENCK. Treats of the financial side of forestry, dealing with the scientific and practical development of forest finance, viewing forestry as an investment. *Price, $1.25*

FOREST PROTECTION. By C. A. SCHENCK. Treats on protection of forests from the various causes which lead to injury and destruction. *Price, $1.75*

PROFESSION OF FORESTRY, THE. By GIFFORD PINCHOT. A pamphlet containing an address on that subject by Mr. Gifford Pinchot; also an address by Mr. Overton W. Price, on "Study in Europe for American Forest Students," and a list of reference publications for students. *Price, 15c*

FOREIGN IMPORTATIONS

ENGLISH ESTATE FORESTRY. By A. C. FORBES. An authoritative volume on English forest methods from the pen of a well known forester, that should prove of interest to Americans. *Price, $2.50*

FORSTWISSENSCHAFT. (Schwappach.) *Price, 50c*

MANUAL OF FORESTRY. (Schlich.) Five volumes, complete, or separately, as follows (*price, complete, $18.50*);

Vol. I. **"FORESTRY POLICY IN THE BRITISH EMPIRE."** *Price, $3.40*
Vol. II. **"SYLVICULTURE."** *Price, $3.20*
Vol. III. **"FOREST MANAGEMENT."** *Price, $3.60*
Vol. IV. **"FOREST PROTECTION."** *Price, $4.80*
Vol. V. **"FOREST UTILIZATION."** *Price, $4.80*

This is perhaps the most authoritative work that has been issued on the technical side of forestry, translated from the German.

WOOD. By G. S. BOULGER. An important new book for arboriculturists and forestry students. A manual of the natural history and industrial applications of the timbers of commerce. Cloth. 82 Illustrations. *Price, $4.20*

FAMILIAR TREES. By Prof. G. S. BOULGER. Written by an eminent botanical authority, yet couched in language easily understood. The coloured plates are the work of celebrated artists, and are truthful and trustworthy in every respect. A special feature is the series of photo-micrographic illustrations of sections of woods. Three volumes. *Price, per volume, $1.50*

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MANUAL OF THE TREES OF NORTH AMERICA (exclusive of Mexico). By CHARLES SPRAGUE SARGENT. A volume that presents in convenient form and with excellent illustrations, authoritative information concerning the trees of North America. It is written in a manner that enables the reader to readily find to what family or species any particular tree belongs. *Price, $6.00*

AMERICAN WOODS. By ROMEYN B. HOUGH. A new departure in the publication of an authoritative work illustrated with actual wood sections of the various species described. Three are given of each, viz.: radial, transverse, and tangential. Issued in ten parts, per part *Price, $5.00*

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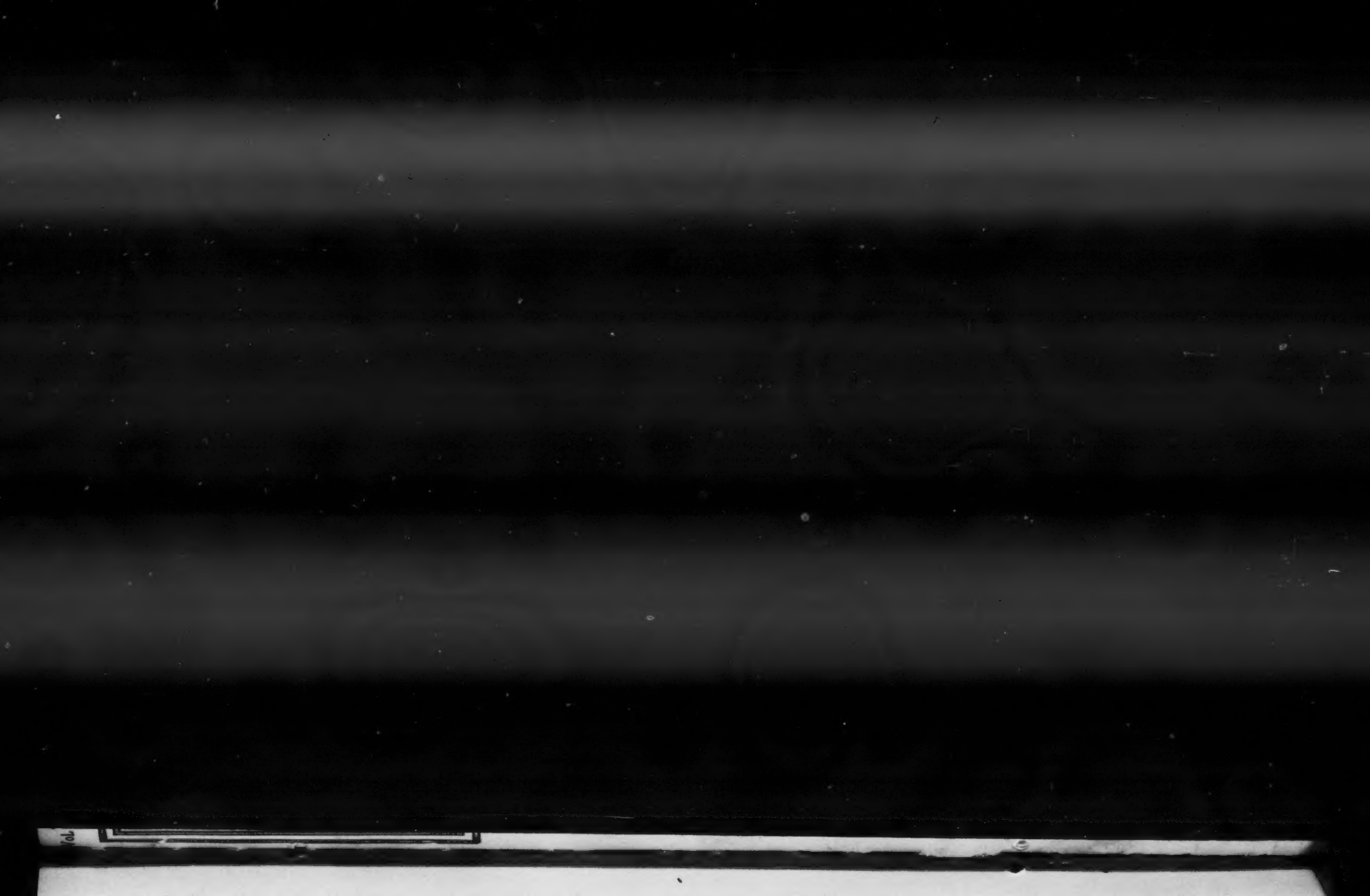
HOW PLANTS GROW. By ASA GRAY. An understanding of the way in which a tree grows is of prime importance to the forester, and the matter here presented is accurate and authoritative. *Price, 80c*

PRINCIPAL SPECIES OF WOOD; THEIR CHARACTERICTIC PROPERTIES. By CHARLES HENRY SNOW. No attempt is made to give exhaustive descriptions of species, but the author presents a mass of information designed for the use and instruction of woodworkers, etc., in a popular style. A host of concise information is brought under each head, and the work is a valuable one. *Price, $3.50*

 These books sent prepaid upon receipt of price indicated, by AMERICAN FORESTRY 1410 H Street N. W., Washington, D. C.



work in this country we find that it began in Florida by Congress appropriating in 1825 the sum of $10,000 to buy live oak lands on the Santa Rosa Sound, in Western Florida, and subsequently other Florida lumber lands.

"Young oaks were planted on the Santa Rosa lands, but there was much difficulty in inducing the young trees to grow, and finally a large quantity of acorns were planted, a fair proportion of the crop coming to perfection.

"But even at that time the chief efforts of the foresters were directed toward pruning, training and caring for the wild trees. All this was done that we might have timber to build war ships. Then came the civil war and brought a complete change in war vessels by substituting iron for wood, and forestry work was stopped.

"The timber lands were neglected and soon began to be occupied by squatters, and after a number of years all reserves except some of the Florida lands were opened to settlers. As long ago as 1885, 25 years ago, a Congress of Forestry was held at De Funiak Springs, at which Profesor A. H. Curtis read a paper on the forest trees of Florida. Professor Curtis enumerated 202 native trees."

Beech Leaf Moth in Massachusetts

Considerable damage is being done in Massachusetts by the beech leef skeletonizer known as Bucculatrix canadensisella. No permanent injury to the trees is anticipated, since past outbreaks, like that of 1901, have been quickly suppressed by natural enemies.

To Conserve Lake George Region

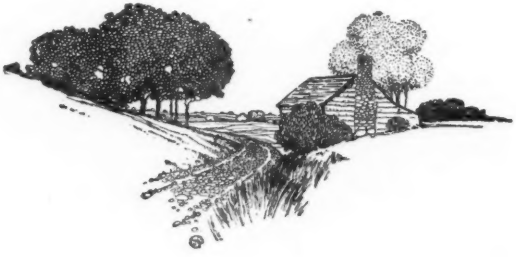
The Lake George Association will lay before the New York legislature at its next session plans for conserving the forests and streams of the Lake George region, by making it either a part of the Adirondack Reserve or a separate park.

Teak Forests of Siam

The great teak forests of Siam are in Payap or northern Siam and in the upper parts of the Nakonsavan and Pitsanuloke provinces. The teak tree grows scattered among trees of many species at an elevation not exceeding 2,500 feet, and prefers the hillsides and comparatively dry land in districts where the average annual rainfall does not exceed fifty inches. The total exports of teak from the port of Bangkok, Siam, are nearly 8,000,000 tons, valued at over four and one-quarter million dollars. It ranks second in the exports of Siam.

The survey of these forests was begun in 1907 and is not yet finished. They are now under the supervision of a well organized forestry department, based on the India-Burmese system, with trained European officers in charge. Only trees of seventy-six and one-half inches girth can now be girdled or barked near the ground and a certain number of trees must be left untouched within a given area to seed the ground for future. After being girdled the tree soon dies and is left standing to season for about two years. It is then cut down, dragged by elephants or buffaloes to the nearest stream, and floated to Bangkok or Moulmain. The teak industry forms one of the most important resources of the country and thousands of people are engaged in cutting, hauling, and rafting the teak logs to the Bangkok markets and sawmills.

The chief uses for this wood are for shipbuilding, furniture, the better class of wooden houses, and rolling stock. Besides its hardness and durability, it contains an oil which prevents the rusting of iron or steel imbedded in it, and it is not attacked by the white ant, which is so destructive to other woods in the tropics. Forestry in Siam, however, is by no means limited to teak, as many other valuable woods are found in the extensive forests, both in the north and south of Siam. —*Exchange.*



STATE FOREST OFFICERS

Important changes have taken place during the past year in both the organization and the personnel of the state forest departments, and similar changes are taking place constantly. In order to record the progress made, as well as to invite corrections and make the list complete and accurate, a table of state forest officers, with their titles and addresses, is printed below:

State or territory	Name and post-office	Official position
Alabama	John H. Wallace, Jr., Montgomery	Commissioner, department of game and fish.
California	G. M. Homans, Sacramento	State forester.
Connecticut	S. N. Spring, New Haven	State forester.
Hawaii	Ralph S. Hosmer, Honolulu	Superintendent of forestry.
Indiana	Charles C. Deam, Indianapolis	Secretary, state board of forestry.
Iowa	G. B. MacDonald, Ames	Forester, agricultural experiment station.
Kansas	Chas. A. Scott, Manhattan	State forester.
Kentucky	M. C. Rankin, Frankfort	Commissioner, department of agriculture, labor and statistics.
Louisiana	F. J. Grace, Baton Rouge	State forest commissioner.
Maine	Edgar E. Ring, Augusta	Land agent and forest commissioner.
Maryland	F. W. Besley, Baltimore	State forester.
Massachusetts	F. Wm. Rane, Boston	State forester.
Michigan	Marcus Schaef, Roscommon	State forester.
	Filibert Roth, Ann Arbor	State forest warden.
Minnesota	Gen. C. C. Andrews, St. Paul	Forestry commissioner.
Montana	Charles W. Jungberg, Helena	State forester.
New Hampshire	E .C. Hirst, Concord	State forester.
New Jersey	Alfred Gaskill, Trenton	Secretary, forest park reservation commission, and forester.
New York	James S. Whipple, Albany	Commissioner, forest, fish and game commission.
	C. R. Pettis, Albany	Superintendent of state forests.
North Carolina	J. S. Holmes, Chapel Hill	Forester.
Ohio	Edmund Secrest, Wooster	Forester, state agricultural experiment station.
Oregon	J. W. Baker, Cottage Grove	Forestry, fish and game warden.
	A. B. Wastell, Portland	Secretary, state board of forestry.
Pennsylvania	Robert S. Conklin, Harrisburg	Commissioner of forestry.
Rhode Island	Jesse B. Mowry, Chepachet	Commissioner of forestry.
Tennessee	H. A. Morgan, Knoxville	Director, college of agriculture and experiment station.
Vermont	Austin F. Hawes, Burlington	State forester.
Virginia	G. W. Koiner, Richmond	Commissioner, department of agriculture and immigration.
Washington	R. W. Condon, Port Gamble	Chairman, state board of forest commissioners.
	J. R. Welty, Olympia	State firewarden and forester.
West Virginia	A. B. Brooks, Morgantown	State forester.
Wisconsin	Edward M. Griffith, Madison	State forester.

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Georgia Forestry Association	Alfred Akerman	Athens.
Iowa Park and Forestry Association	Welsey Greene	Des Moines.
Louisiana Forestry Association	Mrs. A. B. Avery	Shreveport.
Maine Forestry Association	Edgar E. Ring	Augusta.
Massachusetts Forestry Association	Irving T. Guild	4 Joy St., Boston.
Michigan Forest Association	H. G. Stevens	25 Band Chambers, Detroit.
Minnesota State Forest Association	E. G. Cheyney	St. Anthony Park.
Nebraska Park and Forestry Association	Miss Leila B. Craig	York.
New England Forest, Fish and Game Association.	Arthur T. Harris	16 State St., Boston.
New Hampshire—Society for the Protection of New Hampshire Forests.	Allen Hollis	Concord, N. H.
New York—American Forest Preservation Society.	Geo. Milroy Bailey	Corfu, N. Y.
Forestry, Water Storage and Manufacturing Association of the State of New York.	Chester W. Lyman	1 Broadway, New York.
Northern New York Forestry Association	O. B. Trappan, Director.	Potsdam, N. Y.
State of New York Fish, Game and Forest League.	L. C. Andrews	Elmira.
The Association for the Protection of the Adirondacks.	Edward Hagaman Hall.	Tribune Bldg., New York City.
North Dakota State Sylvaton Society	Miss Ella J. Mitchell	Penn.
Ohio—Cincinnati Forest and Improvement Association.	Adolph Leue	127 West Twelfth St., Cincinnati.
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